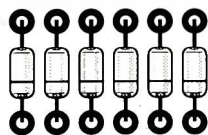
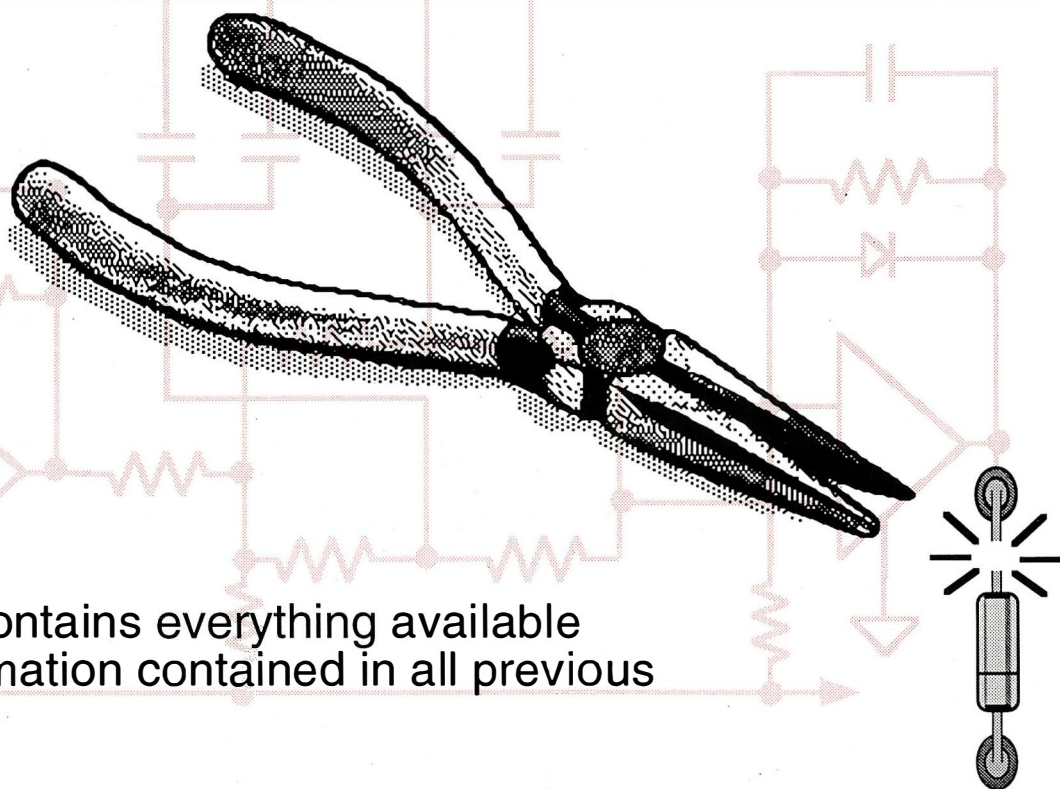


Number 6A



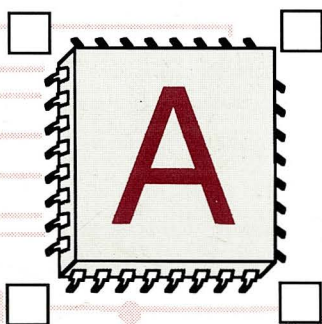
\$19.95

# Radio / Tech Modifications & Alignment Controls



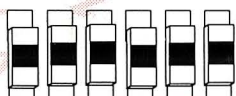
This Volume contains everything available  
including information contained in all previous  
volumes

Modifications for:



## ICOM Kenwood Scanners

See back cover for specific radios



Este manual foi doado por PY2WFG Wilson  
para ser scaneado e disponibilizado  
GRATUITAMENTE a toda a comunidade

Scaneado em cores, 300 DPI (é o maximo que minha maquina faz,  
nao me batam) em uma copiadora Lexmark X864de, imagens  
tratadas com o programa IRFANVIEW e pdf gerado com o Adobe  
Acrobat XI Pro, usando Clearscan

Eu scaneio, trato e disponibilizo manuais gratuitamente meramente  
pelo prazer de faze-lo. Caso voce queira ajudar com manuais,  
insumos e ate mesmo uma merrequinha pra ajudar na conta de luz  
e na manutenção da maquina, entre em contato pelo email  
alexandre.tabajara@gmail.com (tambem é pix)

Obrigado a todos que ajudaram ate aqui

Os sites onde esses scans podem ser encontrados:

- [www.bama.org](http://www.bama.org)
- <http://tabajara-labs.blogspot.com>
- <http://tabalabs.com.br/esquemateca>
- <https://datassette.org/>

ATENÇÃO: AS PAGINAS EM BRANCO ESTAO EXATAMENTE  
COMO NO MANUAL. O OBJETIVO DE MANTE-LAS É VOCE  
PODER IMPRIMIR UM MANUAL IDENTICO AO ORIGINAL.  
NAO ESTÁ FALTANDO PAGINA NENHUMA NO MANUAL

Distribuição **GRATUITA**. Respeite o meu trabalho.  
São Paulo, Agosto de 2021



# Radio / Tech Modifications & Alignment Controls

Volume 6A



Dev.

*artsci*

P.O. Box 1428  
Burbank, CA 91507  
(818) 843-4080  
FAX: (818) 846-2298

## **Radio / Tech Modifications**

Copyright © 1990, 1991, 1992, 1993 artsci, inc.

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage and retrieval system, without permission in writing from the Publisher, artsci inc., P.O. Box 1848, Burbank, CA 91507.

NUMBER 6 10 9 8 7 6 5 4 3 2 1

ISBN 0-917963-010-5 \$19.95

### **Notice of Liability**

The information in this book is distributed on an "AS IS" basis, without warranty. Neither the author nor artsci inc shall have any liability to the customer or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the modifications contained herein. This includes, but is not limited to, interruption of service, loss of use, loss of business or anticipatory profits, or consequential damages from the information in this book.

artsci inc, books are available for bulk sales at quantity discounts. For information, please contact Marketing Manager, artsci inc, P.O. Box 1848, Burbank, CA 91507 FAX: (818) 846-2298

*Printed in the United States of America*

# Contents

|                                          |            |
|------------------------------------------|------------|
| PREFACE.....                             | 1          |
| INTRODUCTION.....                        | 1          |
| Who should perform modifications.....    | 1          |
| Use the proper equipment.....            | 1          |
| Modification of type accepted equip..... | 2          |
| How far 'out of band' will it go?.....   | 2          |
| Accuracy and new modifications.....      | 2          |
| Service Tools.....                       | 3          |
| Poor Man's service tools.....            | 4          |
| ICOM.....                                | ICOM -1    |
| KENWOOD.....                             | KENWOOD-1  |
| SCANNERS.....                            | SCANNERS-1 |
| APPENDIXES                               |            |
| A.    COAX LOSS CHART, DB ATT. CHART     |            |
| B.    RESISTOR / CAP COLOR CODES         |            |
| C.    PL ENCODER HOOK UP.                |            |
| D.    PL TONES / CMOS-TTL CIRCUIT        |            |
| E.    PL DECODER HOOK UP 1               |            |
| F.    PL DECODER HOOK UP 2               |            |
| G.    MEMORY CHANNEL ASSIGNMENTS         |            |
| PERFORMANCE REPORT SHEETS.....           | P - 1      |
| ADVERTISEMENTS.....                      | ADV        |





# STARTEK INTERNATIONAL INC. FREQUENCY COUNTERS

**Made  
in  
USA**

## WARRANTY

**5 YEARS all parts  
1 YEAR labor  
ALL MODELS**

## FIND FREQUENCIES FAST

With the new, high sensitivity, ultra-fast, Auto Trigger & Hold **STARTEK** frequency counters. Increase readability distance with the new Band Pass Filters. All products made in USA.

## AUTO TRIGGER & HOLD

Now, for the first time, available on inexpensive, portable counters with our new **ATH™** Series. This feature is the most significant improvement ever made to the pocket sized counters! It allows "Hands Free" operation to automatically read & hold a signal as quick as 80ms or 8% of a second.

# New ATH™ Series

Say goodbye to random counting & false readings with the **ATH™** Series

**TA-90 Antenna**  
(priced separately)

**Introducing  
NEW  
ATH-50**

**ATH-50**  
5 Hz to 2800 MHz  
One-Shot Feature

**Signal  
Strength  
Bar Graph  
Works  
on Every  
Range**

**Low  
Battery  
Indicator**

**Ultra Bright  
Display**

Size 4" h x  
3.5" w x 1" d  
Aluminum  
Cabinets  
(No Self Tap  
Screens)



**ATH-15**  
1-1500 MHz

**HP-400**  
Band Pass Filter



**ATH-30**  
1-2800 MHz  
One-Shot Feature



**In Stock... Same Day Shipment!**

## Ultra High Sensitivity Frequency Counters

|               |                                                             |        |                   |
|---------------|-------------------------------------------------------------|--------|-------------------|
| <b>ATH-15</b> | 1-1500 MHz, High speed                                      | \$199. | <del>\$235.</del> |
| <b>ATH-30</b> | 1-2800 MHz, High speed, one shot                            | 259.   | <del>289.</del>   |
| <b>ATH-50</b> | 5 Hz to 2800 MHz, one shot                                  | 289.   | <del>329.</del>   |
| <b>HST-15</b> | Optional 0.2 PPM TCXO<br>High Accuracy Timebase (installed) | 100.   | <del>125.</del>   |

## Economy Frequency Counter

|             |                                                     |        |                 |
|-------------|-----------------------------------------------------|--------|-----------------|
| <b>1350</b> | 1-1300 MHz, 10 Hz Res.<br>3 gate times, Hold switch | \$119. | <del>129.</del> |
|-------------|-----------------------------------------------------|--------|-----------------|

## Band Pass Filters

Increase range or distance from a transmitter with a Band Pass Filter. <1 dB pass band insertion loss.

|               |                                      |                               |
|---------------|--------------------------------------|-------------------------------|
| <b>LP-60</b>  | DC-60 MHZ Usage                      | \$69.                         |
| <b>HP-400</b> | 400-1500 MHZ Usage                   | 69.                           |
| <b>HP-800</b> | 800-2000 MHZ Usage                   | 69.                           |
| <b>BP-3</b>   | Above 3 filters ( <b>SAVE \$30</b> ) | <b>\$177.</b> <del>207.</del> |

## Accessories

|                   |                             |     |
|-------------------|-----------------------------|-----|
| <b>A CC-90</b>    | Case for all models         | 12. |
| <b>B TA-90</b>    | Telescope BNC antenna       | 12. |
| <b>C TA-90L</b>   | Telescope elbow antenna     | 16. |
| <b>D RD-150</b>   | 150 MHz rubber duck         | 16. |
| <b>E RD-2750</b>  | 27-50 MHz rubber duck       | 28. |
| <b>F RD-800</b>   | 800 MHz rubber duck         | 29. |
| <b>G M-207-IC</b> | Interface cable for MFJ-207 | 10. |
| <b>H P-110</b>    | 200 MHz, 1x, 10x probe      | 39. |
| <b>J LP-22</b>    | Lo-Pass, audio usage probe  | 25. |
| <b>K DC-10</b>    | Direct, 50 OHM probe        | 20. |

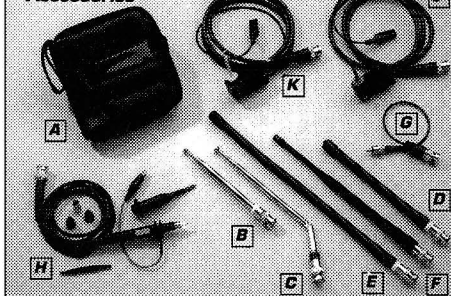
## ATH™ SERIES FEATURES INCLUDE:

- Easy to use - simple controls
- Ultra fast response time
- Extra BRIGHT LED digits
- 3-5 hour battery operation
- Automatic clean dropout
- Maximized sensitivity, <1mV typical
- Signal strength Bar Graph
- 2 ranges - 6 fast gate times
- 9-12V auto-polarity power jack
- StarCab™ aluminum cabinet

**Ni-Cads  
and A/C Charger  
INCLUDED  
with ALL Models**



## Accessories



**Factory Direct Order Lines  
SAME DAY SHIPMENT**

Orders Only **800-638-8050** Orders & Information **305-561-2211**  
FAX 305-561-9133



**STARTEK INTERNATIONAL INC.**

398 NE 38th St., Ft. Lauderdale, FL 33334

Terms: Ship/Hand charges for US & Can \$10, others add 15%. FL residents add tax. C.O.D. \$5. VISA, MC, Discover accepted. Prices and specifications subject to change without notice or obligation.

## Preface

THERE ARE 2 BOOKS IN THIS VOLUME. AN ORDER FORM FOR THE OTHER BOOK IS AVAILABLE IN THE BACK OF THIS BOOK.

We call them Volume 6A and 6B. Volume 6A contains all known modifications for ICOM and Kenwood Radios and mods for the popular scanners. Volume 6B has all the modifications for Yeasu, Alinco, Standard, Azden, KDK, Ten Tec, Ranger, Uniden, Radio Shack and popular CB radios.

During the past 4 years we have created 6 volumes of Radio/Tech modifications. Each new volume included the information contained in the previous volumes. So if you have the current volume, you do not need to purchase the previous ones.

The illustrations are improved each year and the modifications have been performed by many people through out the world. The modifications contained in this book are accurate and current.

We make every effort to provide all available modifications for every radio we can find. We also try to keep the cost of the modification books as low as possible. We ask that you do not photocopy pages from these books. We will support you however we can, however, if you call us we will ask that you have the book in your hands at the time of the call.

It was only logical that we start to include the alignment points for each of the radios. Since you are inside them performing the modification, it is a good time to adjust the Modulation and Power levels. If you are not familiar with testing the levels, a section on service tools is provided to give you three methods of testing your radios.

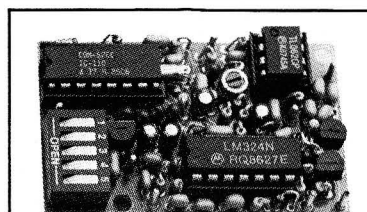
If you find a new radio is not listed in these pages, contact us and ask about it. We may have a copy that did not make the printing deadline. If you purchased the book and have proof of purchase, we can make the new modification available to you.

- Your comments and suggestions are always welcome. If the mod works great, let us know. If you can't make the mod work, let us know. We can't test every modification, we don't have all the radios. Your help will make the next volumes better for everyone.

## TS-32P DIP Switch Programmable Encoder-Decoder

**\$57.95**

Universal design provides CTCSS capability to all FM transceivers. On-board DIP switch allows instant programming without tone elements, counters, or other test equipment. Crystal controlled for high accuracy and stability. The 32 location tone memory is complete with standard EIA tones from 67.0 to 203.5 Hz, or may be ordered with ANY 32 custom tone frequencies between 0 - 250.0 Hz ( $\pm 0.1$  Hz) at no extra charge. Multiple tone switching is easily done with your radio's channel select switch or separate single pole switch. A high pass tone rejection filter is included on board to remove tone from received audio. Reverse polarity protection and RF immunity are built in. Powered by 6 - 24 vdc, unregulated at 8ma. Supplied with color-coded wires terminated to plug directly onto the TS-32P. Mounting materials include hardware and double sided, insulated tape.

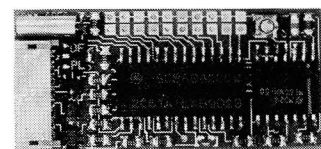


Programmable Encoder-Decoder  
1.25"x2.0"x0.40"

## TS-64 Microminiature CTCSS Encoder-Decoder

**\$64.95**

The latest - and smallest - programmable CTCSS encoder-decoder for use in FM transceivers. Ideal for many handheld radios and others with limited space. Select from 64 preset CTCSS tones between 33.0 Hz and 254.1 Hz using six PCB jumpers. Tone stability is crystal controlled with accuracy better than 0.05 Hz. Output level can be adjusted from 0V to 3.0V. A time-out-timer feature permits programming transmit duration to eight different intervals decreasing "stuck mic" problems. Receiver Hi-pass filter and busy channel lockout are included. Decode sensitivity is 15mv. Power can be from 6.0vdc to 20.0vdc @ 9ma. Operating temperature range is from -30°C to +65°C. When P.T.T. switch is released, the TS-64 continues to key transmitter for 160ms. During this time, the TS-64 generates a reverse phase burst which will mute the decoding unit at the other end. A microminiature plug and socket with color coded wires attached is provided for hookup. Comes with double sided tape for quick mounting.

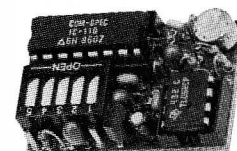


Microminiature CTCSS Encoder-Decoder  
.78"x1.70"x.25"

## SS-32PA DIP Switch Programmable CTCSS Encoder

**\$28.95**

Universal design provides CTCSS encode capability to all FM transceivers. On-board DIP switch allows instant programming without tone elements, counters, or other test equipment. Crystal controlled for high accuracy and stability. The standard 32 tone memory contains the EIA tones from 67.0 to 203.5 Hz (or may be ordered with ANY 32 custom tone frequencies between 0 - 250.0 Hz at no extra charge). Multiple tone switching is easily achieved with your radio's channel select switch or a separate single pole switch.



SS-32PA / SS-32PB Encoder  
0.9"x1.3"x0.4"

## SS-32SMP Micro-Miniature CTCSS Encoder

**\$27.95**

Super small programmable CTCSS encoder for use in handheld radios and other size restricted applications. Has the same basic features as the SS-32PA (see above), but does not include the on-board DIP switch due to size limitations. Programming is done by soldering binary coded jumpers on the tone board.

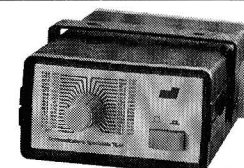


SS-32SMP / SS-32SMP-B Encoder  
0.53"x1.00"x0.16"

## TE-64 Multi-purpose CTCSS/Burst Tone Encoder

**\$79.95**

Fully enclosed encoder provides, from a front dial rotary switch, all EIA CTCSS tones from 67.0 to 203.5 Hz PLUS all the common burst tones from 1600 to 2550 in 50 Hz increments. All available tone frequencies are permanently screened onto the faceplate, and selected with a calibrated dial. Great for test bench or service vehicle applications. Operates on 6-30 vdc, and all connections are made to a terminal strip at the rear of the unit. A 9 volt battery plug and cable is included, and may be attached at the terminal strip or soldered directly to the circuit board for field operation. Packaged in a high impact plastic case, with mounting bracket and hardware supplied.



TE-64 Tone Encoder  
5.25"x3.3"x1.7"

## TE-64D Multi-purpose CTCSS/Burst Tone Encoder w/Display

**\$129.90**

An enhanced version of the TE-64 encoder (see above). Features a two-digit LED which displays a number from 01 to 32 that in turn corresponds with the CTCSS or burst frequency selected by the front panel rotary switch. The two-digit number displayed is cross-referenced to the tone frequency on a chart located on the faceplate. Perfect for mobile applications, night-time operations, or whenever high visibility read-out is desired. Operates on 6-16 vdc (current draw does not allow operation from 9 volt battery).



TE-64D Tone Encoder w/Display  
5.25"x3.3"x1.7"

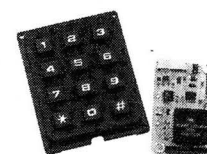
**NEW!**

## ID-8 Automatic Morse Station Identifier

**\$89.95**

Provides automatic Morse station identification for commercial, public safety, and amateur radio applications, including repeaters, base stations, mobiles, beacons, CW memory keyers, etc. Meets all FCC identification requirements. Low voltage/current operation and small size make it universally applicable. Low distortion, low impedance, adjustable sinewave output. High accuracy crystal control. All functions are programmable with plug-on keypad, included with each unit. Programmable options include: Eight selectable messages; CW speed 1-99 seconds; interval timer 1-99 minutes; hold off timer 0-99 seconds; CW tone frequency 100-3000 Hz; front porch delay interval 0-9.9 seconds; CW or MCW; etc. All programming is stored in a non-volatile EEPROM, which may be altered at any time via the included keypad. Supplied with programming keypad, wire set with microminiature plug for easy installation or removal, both hardware and tape mounting materials, and easy to follow instructions.

**NEW!**



ID-8 Automatic Morse Code Identifier  
1.85"x1.12"x0.35"

**COMMUNICATIONS SPECIALISTS, INC.**  
426 WEST TAFT AVENUE • ORANGE, CA 92665-4296  
(714) 998-3021 • FAX (714) 974-3420  
Entire U.S.A. (800) 854-0547 • FAX (800) 424-3420



## Introduction

### WHO SHOULD PERFORM MODIFICATIONS

This book is intended to be used as a reference guide for licensed Technicians. The text for each modification has been written with belief that the performing technician has experience with servicing modern radio equipment.

Attempts to perform these modifications by an inexperienced person may cause serious damage to the radio. Damage can occur by simply opening the radio case incorrectly. With the average repair cost of a damaged radio exceeding \$150.00, it is a good investment paying a licensed technician to perform the modification.

Many of the new radios' components that are barely larger than the head of a pin. Many of these parts require precision soldering. Excessive heat can damage these parts. Caution and the proper tools should be used to avoid damage to the components.

Some of the modifications presented in this book have not been tested. However, most of the modifications have been, at one time or another, reviewed by the technicians at the radio manufacturing or distributing plants.

### USE THE PROPER EQUIPMENT

Alignment controls have been shown on many of the radios presented in the text. Proper alignment of a radio requires test equipment that is usually not available to the average operator. Exercise caution when changing the alignment controls. Improper settings can cause a radio to generate RF signals outside the desired frequency range. These undesired emissions will cause interference to others and may quite possibly be illegal.

Service manuals are valuable to any radio service technician. Service manuals will provide you with a list of components and detailed drawings of your radio. Our technical department is always looking to review the service manuals for the radios presented in this publication. If you have a service manual for a radio present here, we would like to review it.

## **MODIFICATIONS OF TYPE ACCEPTED EQUIPMENT**

Some of the modifications presented in this publication may allow a radio to operate outside its design range. Using a radio outside its designed range may cause radio interference, equipment damage or may simply be illegal. Do not perform the modification if you have any concerns about the validity of the modification, or the purposes for a modified radio. Use your best judgment.

## **HOW FAR 'OUT OF BAND' WILL MY RADIO OPERATE?**

The exact Receive and Transmit Frequency range of a radio are almost impossible to predict. The technicians at the factory tune a radio to operate in the specified range. Most radios can be tuned to operate almost anywhere within a 50 MHz range.

Once a radio is tuned, it should operate anywhere within a 30 MHz window. That's 15 MHz up and 15 MHz down from center. Most of the newer radios have been designed to allow a greatly increased range.

Your radio may operate better 'out of band' towards the bottom half of the workable range, and the next radio may operate better towards the top half.

The modifications presented here deal with opening up the microprocessors allowable frequency range. After a modification is complete, the microprocessor will tell the VCO/VXO circuitry what frequency to operate on. Can the current tuning of the RF coils and the circuitry operate at the desired frequency? That is the big question.

The tuning of the coils and VCO/VXO circuitry can be changed. These changes go well beyond the scope of this publication.

## **ACCURACY AND NEW MODIFICATIONS**

The authors have made every attempt to present all the available modifications. As new radios and modifications become available, they will be added to the next publication. Outside contributions are accepted. A number of useful graphs, charts and tables are provided in the appendices.

Technicians are welcome to forward comments, suggestions and new modifications. Forward your modifications to our mailing address or FAX a copy to us.

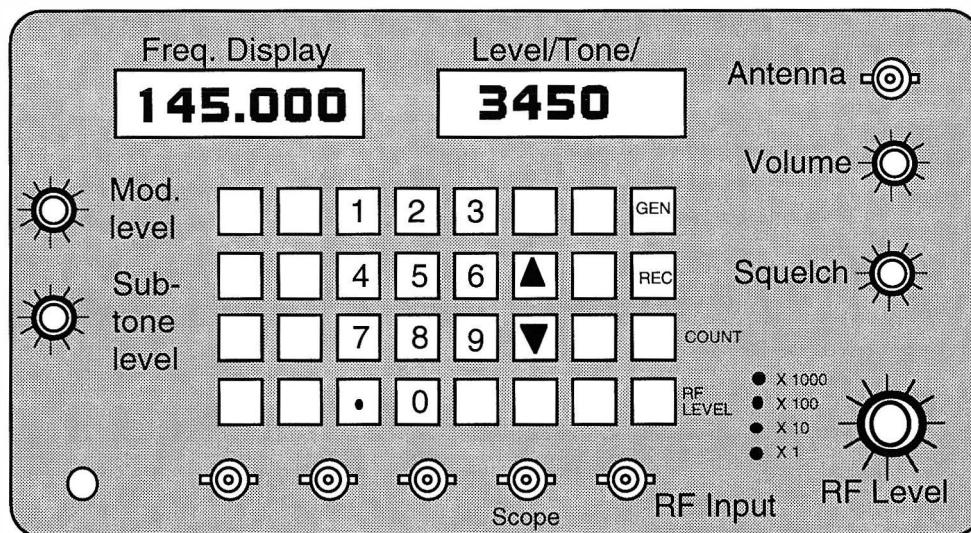


## SERVICE TOOLS

The cost of a service monitor, even the least expensive model, is over \$2,000. You may be able to pick up a used unit for around \$500. If you do manage to find a used service monitor, take it to be tested or calibrated on a new service monitor.

A service monitor performs a number of functions that are invaluable in aligning all types of radios. It can generate a signal on an exact frequency and allow you to control the signal strength and the amount of modulation applied to the signal. This feature will allow you to properly align the S-Meter and test the receiver sensitivity. A good receiver has a sensitivity of less than .2 micro volts.

## Service Monitor



Perhaps the most valuable feature of a service monitor is its ability to act as a receiver and measure the frequency error & modulation.

Frequency error is measured in Hertz. A normal transmitter can be aligned or tuned up or down by as much as 5 kHz. (5,000 Hz). Most radios have an alignment control that will allow you to adjust the frequency up or down. A transmitter should be exactly on frequency. Within 200 Hz plus or minus is acceptable.



Measuring the modulation of a signal will allow you adjust the transmitter's microphone audio, DTMF pad and Sub-audible tone levels.

### **Suggested modulation levels:**

|                       |                  |
|-----------------------|------------------|
| Audio (microphone)    | 3,500 - 4,000 Hz |
| DTMF (touch tone)     | 3,000 - 3,500 Hz |
| PL (Sub-audible tone) | 600-650 Hz       |

Alignment controls for these levels are available in most radios.

### **Other Valuable tools**

There are a number of other tools that are a great deal less expensive than a service monitor. Most of these tools you should have in your tool box. If you do not have these tools, it a good idea that you invest a few dollars and pick them up.

### **Soldering iron**

The modifications in this book require a 30-40 watt soldering iron. Make sure you have a small tip for the iron. A soldering gun is much too big. If you have one of the old guns, put it away until you are assembling a PL connector.

Some of the components used in the new radios are smaller than the letters in this sentence. You will need a steady hand and some experience desoldering components. A supply of solder braid is often the best method of removing a component.

### **Magnifying glass**

Don't make a mistake here. The parts in the modern radios are small. You may not need one on some older radios, but open up one of the newer radios and you will wish one was handy.

## Digital Volt/OHM Meter (DVM)

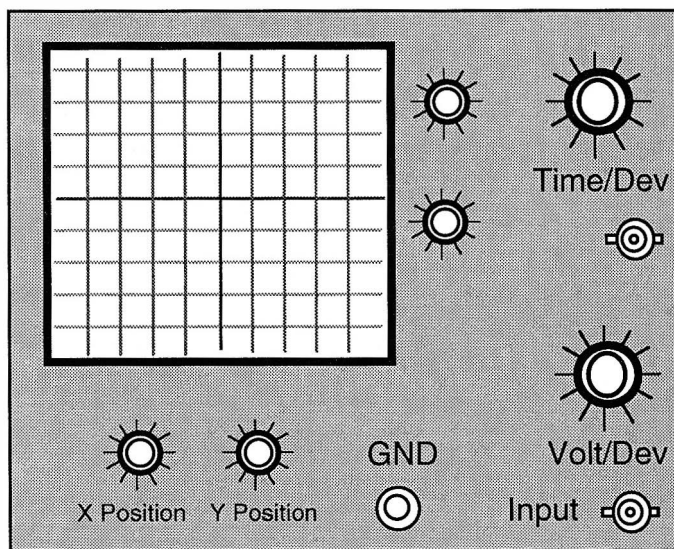
You must get one of these. They are handy for many things. Try to get one that has a continuity tone setting. An auto ranging meter is the best. If you can afford it, get one that has an auto shut off feature. Nothing is worse than grabbing your meter and finding the batteries are dead because you forgot to shut it off the last time you used it.

## **POOR MAN'S SERVICE TOOLS**

If you are like most of us and can not afford a service monitor, there is a method available using inexpensive tools and a little help from a friend.

An oscilloscope is probably the most valuable instrument you can have. The cost of a new unit ranges from \$250 up. A used unit can be purchased for as low as \$50.

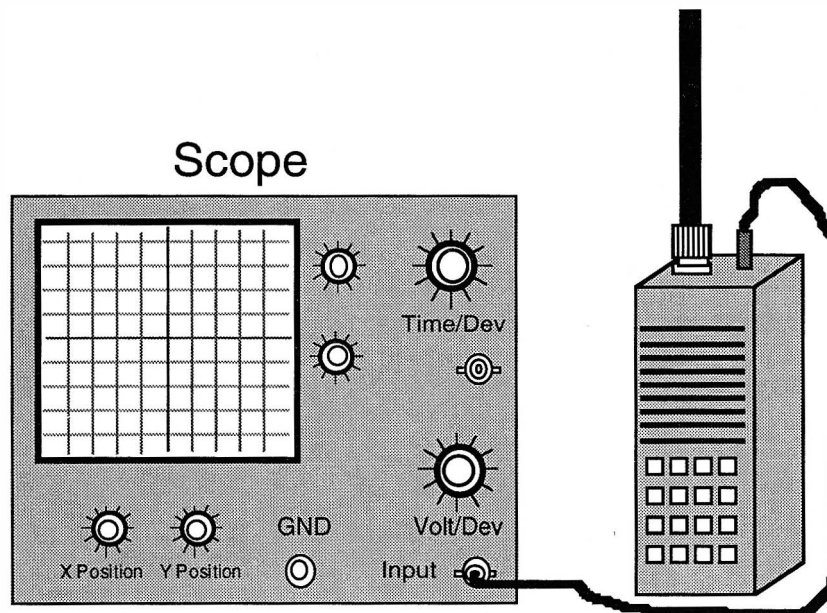
## Scope



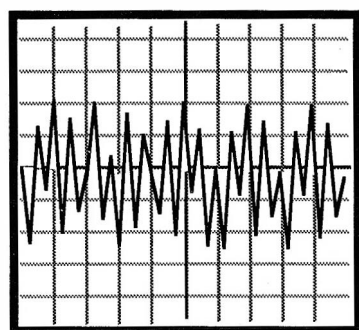
By connecting the receiver audio output (from the speaker jack) to the oscilloscope input, you can get an accurate visual view of the audio wave. With a little practice, you can accurately measure the audio levels.

## Introduction

If you are tuning up a transmitter, or the transmitter section of a transceiver, you will need the use of another receiver. If you have or can borrow a friend's handi-talkie, it will work just fine.



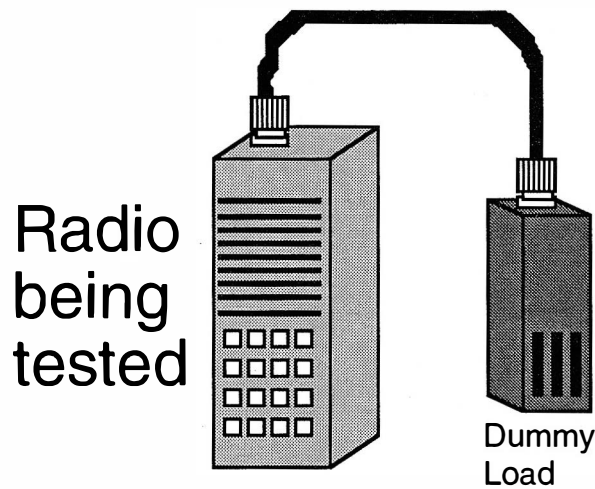
Connect your friends radio up to the oscilloscope through the external speaker jack. Turn the radio and oscilloscope on and adjust the receiver audio level to about 1/3. Turn the squelch off. Turn the Volt/Dev control to adjust the waves until they fill 1/2 of the display.



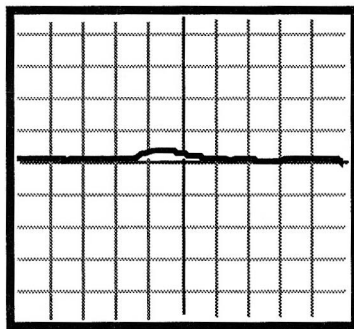
Unsquelched  
audio

2 ms time  
.2 Volts

There is a fine tuning control for both the Volt/Dev and Time/Div controls. Place them in the center position until you are ready to adjust the scope display discussed below.



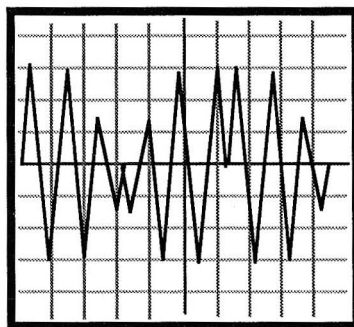
Now using your transmitter, press the PTT. (Make sure you are using a dummy load.) The scope display should appear below.



Unmodulated carrier

2 ms time  
.2 volts

Now that you have the scope set up. Press the PTT key and talk into the microphone and watch the display. Hold the mic 3-4 inches away and say "FOUR" into the mic. Stretch the "FOUR" for 5 seconds.



Voice modulation

(say "FOUR" into the mic)

Maximum  
Deviation

2 ms time  
.2 volts

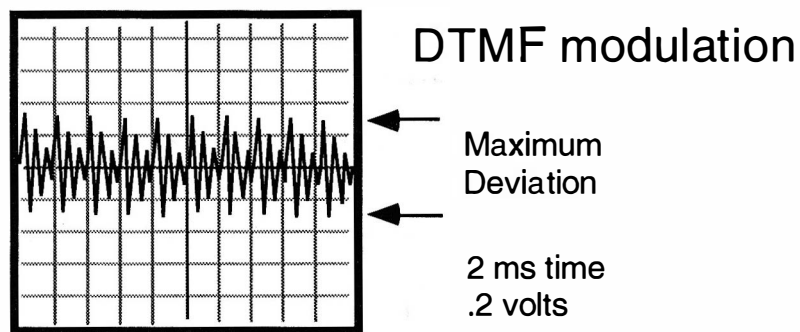
The pattern on the scope is not as important as the maximum height of the wave crests.

The simplest testing method to see if your radio is accurately adjusted is to compare its signal to another radio that is operating properly. Transmit with the "GOOD" radio and adjust the scopes Volts/Div control to place the audio peaks at the markers as shown in the example above.

Now transmit with your radio and compare where the voice peaks are placed. If they are higher, adjust the Modulation/Deviation controls in your transmitter to a lower position. If they are lower, increase the control's position.

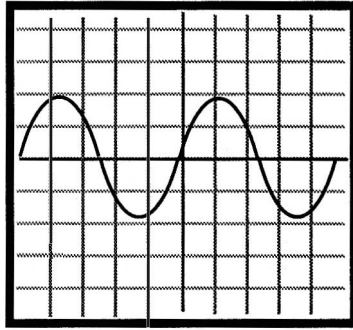
If possible, adjust the modulation/deviation control while you are transmitting and modulating.

You can adjust the levels of the DTMF key pad using the same method used on audio modulation. All DTMF tones have a rhythmic shape on the scope display. The DTMF tones will be lower in level than audio peaks. This is normal.



You can also adjust the level of the Sub-Audible PL tone using the scope. It will be necessary to adjust the Volt/div control to be more sensitive. A PL tone is only 20% the level of the voice modulation. Adjust the control to approx. 20 milli volts. Do not modulate the carrier with audio while you are adjusting the PL level.





## Sub-Audible carrier

2 ms time  
20 m volts

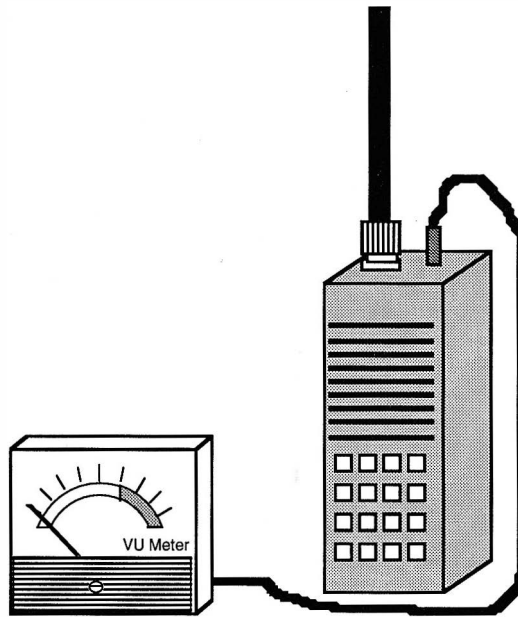
Some receivers will filter out the sub-audible tone before it appears at the speaker jack. Most of the newer receivers do not do this so you should have no trouble watching the sub-audible wave form. If you can not get the expected wave form, check to make sure the transmitter is encoding PL tone. You should also check the receivers PL decode is turn off.

If you have gone this far, watch the display when you modulate a carrier that has a sub-audible tone. You will still see the tone no matter what type of modulation you use.

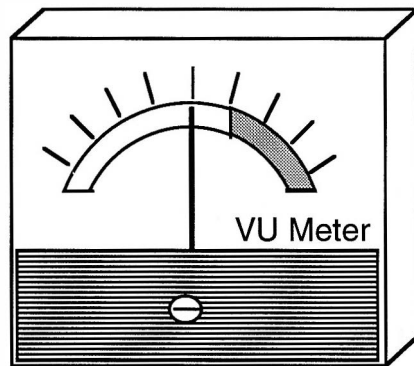
### A more inexpensive method.

There is another method of checking the audio deviation levels using an audio VU meter. A VU meter can be purchased at your local Radio Shack. You can purchase the meter by itself, or in a case ready to hook up to your stereo.

Connect the VU meter to the speaker jack of your friend's radio or receiver.



Using a properly working transmitter, transmit and hold down a DTMF tone key and adjust the receiver's volume control to cause the VU meter needle to set at the half-way point.



Adjust receiver volume to set meter at half-way position

Again press the PTT and measure where normal speaking audio causes the needle to peak.

Now using the radio to be tested, perform the same tests and adjust the transmitter's deviation controls to match the levels of the other radio.

This method will not work accurately enough to test sub-audible tone levels.

# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

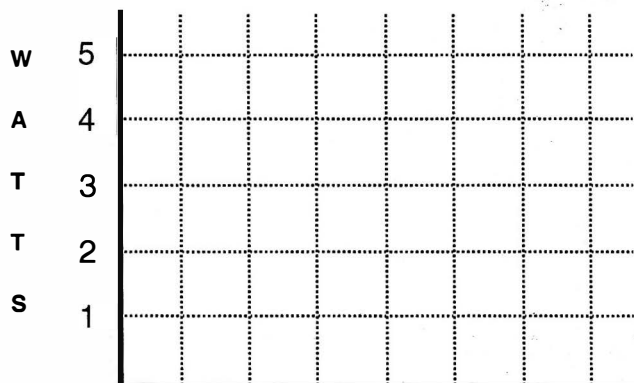
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

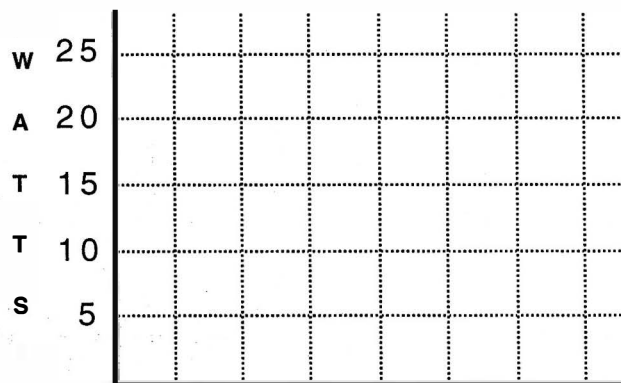
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

| Description                    | Before      | After       |
|--------------------------------|-------------|-------------|
| Power out (Low)                | _____ Watts | _____ Watts |
| Power out (High)               | _____ Watts | _____ Watts |
| Frequency Error (Simplex)      | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)       | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band) | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| PL Deviation                   | _____ Hz    | _____ Hz    |
| DTMF Deviation                 | _____ KHz   | _____ KHz   |
| Audio Deviation                | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr   | _____ MHz   | _____ MHz   |

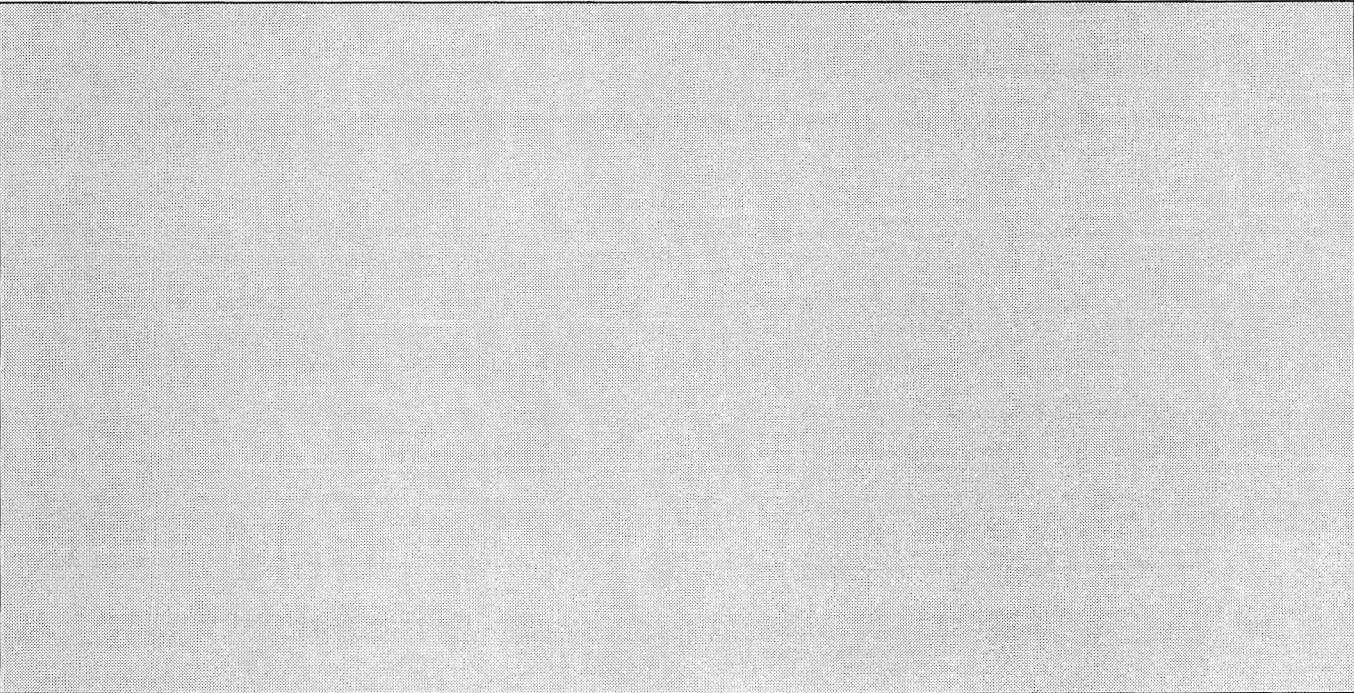


Frequency



Frequency

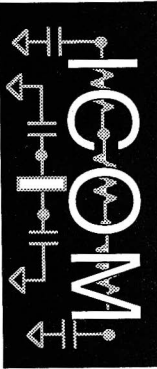
Lined area for notes.



# Radio / Tech Modifications

## ICOM Radio Modifications

| <b>Model</b> | <b>Modification</b>                              | <b>Page # ]</b> |
|--------------|--------------------------------------------------|-----------------|
| IC-02AT      | Expanded RF / Scan rate Increase.....            | I - 3           |
| IC-2A/AT     | Alignment controls.....                          | I - 4           |
| IC-2iA/E     | Expanded RF.....                                 | I - 5           |
| IC-2GAT      | Expanded RF / Alignment controls.....            | I - 7           |
| IC-2SA       | Expanded RF.....                                 | I - 8           |
|              | Alignment controls.....                          | I - 9           |
| IC-2SAT      | Expanded RF.....                                 | I - 8           |
|              | Alignment controls.....                          | I - 9           |
| IC-3SAT      | Expanded RF.....                                 | I - 8           |
|              | Alignment controls.....                          | I - 9           |
| IC-2SRA      | Expanded RF / Alignment controls.....            | I - 10          |
| IC-04AT      | Expanded RF .....                                | I - 11          |
| IC-4GAT      | Expanded RF/ Alignment controls.....             | I - 12          |
| IC-4SAT      | Expanded RF/ Alignment controls.....             | I - 13          |
| IC-4SRA      | Expanded RF / Alignment controls.....            | I - 14          |
| IC-12AT      | Expanded RF .....                                | I - 15          |
| IC-12GAT     | Alignment controls.....                          | I - 16          |
| IC-24        | Expanded RF/ Alignment controls.....             | I - 17          |
| IC-25        | Expanded RF/ Alignment controls.....             | I - 18          |
| IC-27A/H     | Adjustment controls.....                         | I - 19          |
| IC-28A/H     | Expanded RF/ Alignment controls.....             | I - 20          |
| IC-32AT      | Expanded RF / 10MHz entry / X Band Repeater..... | I - 21          |
| IC-38        | Alignment controls.....                          | I - 22          |
| IC-48        | Expanded RF .....                                | I - 23          |
| IC-228       | Expanded RF.....                                 | I - 24          |
|              | Alignment controls.....                          | I - 25          |
| IC-229       | Expanded RF - Mars/Cap+.....                     | I - 26          |
| IC-290       | Expanded RF .....                                | I - 27          |
| IC-448       | Expanded RF.....                                 | I - 28          |
|              | Alignment controls.....                          | I - 29          |
| IC-449       | Expanded RF/ Alignment controls.....             | I - 30          |
| IC-575       | Expanded RF .....                                | I - 31          |
| IC-720       | Expanded RF .....                                | I - 32          |
| IC-725       | Expanded RF .....                                | I - 33          |
| IC-726       | Expanded RF .....                                | I - 34          |
| IC-729       | Expanded RF .....                                | I - 35          |
| IC-730       | Expanded RF .....                                | I - 36          |
| IC-735       | Expanded RF .....                                | I - 37          |
| IC-737       | Expanded RF .....                                | I - 38          |
| IC-740       | Expanded RF .....                                | I - 39          |
| IC-745       | Expanded RF .....                                | I - 40          |



| <b>Model</b>                     | <b>Modification</b>                                     | <b>Page # ]</b> |
|----------------------------------|---------------------------------------------------------|-----------------|
| IC-751                           | Expanded RF .....                                       | I-41            |
| IC-761                           | Expanded RF .....                                       | I-42            |
| IC-765                           | Expanded RF .....                                       | I-43            |
| IC-781                           | Expanded RF .....                                       | I-44            |
| IC-900                           | Expanded RF / Alignment controls / X Band Repeater..... | I-45            |
| IC-901A                          | Expanded RF / X Band Repeater.....                      | I-46            |
| IC-970                           | Expanded RF/ X Band Repeater.....                       | I-47            |
| IC-1200                          | Expanded RF - 870-960 MHz.....                          | I-49            |
| IC-2400                          | Expanded RF - Mars/Cap+ / X Band Repeater.....          | I-50            |
|                                  | Alignment controls.....                                 | I-51            |
| IC-2410                          | Expanded RF.....                                        | I-52            |
|                                  | Special Functions.....                                  | I-53            |
| IC-2500E                         | Expanded RF - Mars/Cap+ / X Band Repeater.....          | I-54            |
|                                  | Alignment controls.....                                 | I-55            |
| IC-3200                          | Expanded RF.....                                        | I-56            |
|                                  | Alignment controls.....                                 | I-57            |
| IC-3210                          | Expanded RF - Mars/Cap+ / X Band Repeater.....          | I-58            |
|                                  | Alignment controls.....                                 | I-59            |
| IC-3220                          | Expanded RF - Mars/Cap+ / X Band Repeater.....          | I-60            |
|                                  | Alignment controls.....                                 | I-61            |
| IC-3230                          | Expanded RF - Mars/Cap+ / X Band Repeater.....          | I-62            |
| IC-H16                           | User Programmable mod.....                              | I-63            |
| IC-M600                          | Expanded RF .....                                       | I-64            |
| IC-M800                          | Expanded RF .....                                       | I-65            |
| IC-P2AT                          | Expanded RF/ Alignment controls.....                    | I-66            |
| IC-P4AT                          | Expanded RF/ Alignment controls.....                    | I-67            |
| IC-R71                           | Expanded RF .....                                       | I-68            |
| IC-R7000                         | 100 Memory channels.....                                | I-69            |
| IC-RP1220                        | CTCSS Default.....                                      | I-70            |
| IC-RP1520                        | CTCSS Default.....                                      | I-70            |
| IC-RP4020                        | CTCSS Default.....                                      | I-70            |
| IC-RP4520                        | CTCSS Default.....                                      | I-70            |
| IC-DELTA1                        | Expanded RF .....                                       | I-71            |
| IC-U2AT                          | Expanded RF / Alignment controls.....                   | I-72            |
| IC-U4AT                          | Expanded RF / Alignment controls.....                   | I-73            |
| IC-U16                           | User Programmable mod.....                              | I-74            |
| IC-W2A                           | Expanded RF / Alignment controls.....                   | I-75            |
| IC-W21A                          | Expanded RF / X Band Repeater.....                      | I-77            |
| IC-W21AT                         | Expanded RF / X Band Repeater.....                      | I-78            |
|                                  | Alignment controls.....                                 | I-79            |
| IC-X2A                           | Expanded RF / Alignment controls.....                   | I-76            |
| IC HT'S TO TNC'S.....            |                                                         | I-80            |
| RESET COMMANDS - all models..... |                                                         | I-81            |

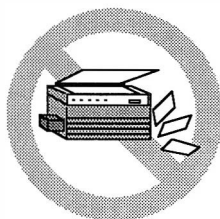
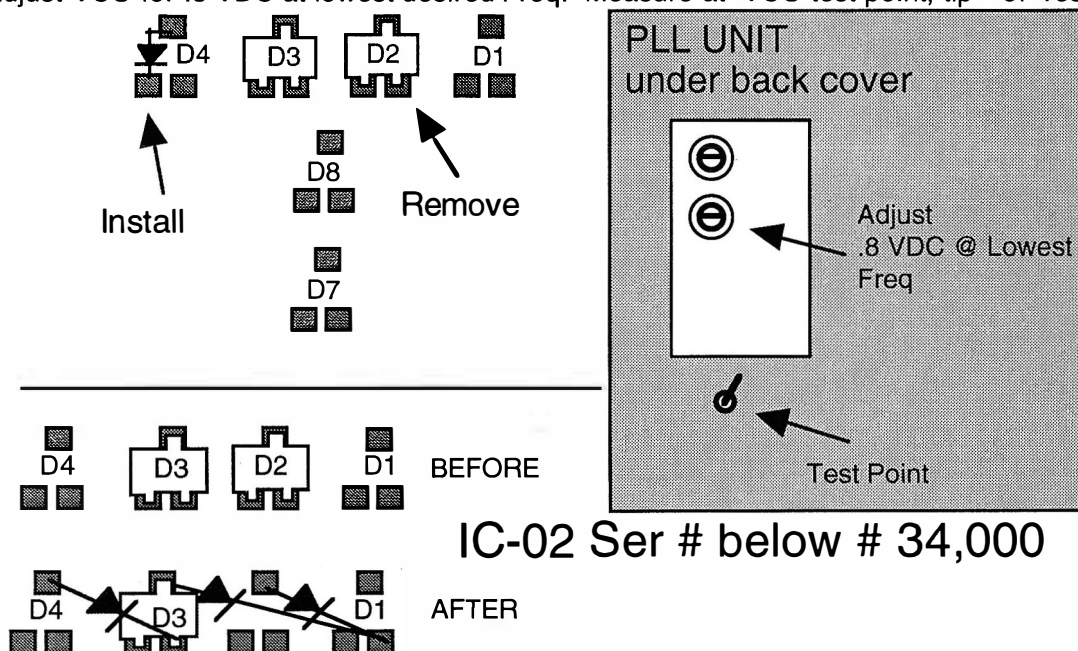


## ICOM IC-02AT

### EXPANDED RF/ SCAN RATE INCREASE

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and remove chip diode D2 on Logic unit.
4. On 02's with ser # over 34,000 - Install a diode across pads of diode D4 (see drawing) 1N4148 or 1SS211
5. On serial #'s below 34,000 install three diodes. (see drawing)
6. Locate R413 on logic board, it is located below the right hand corner of the microprocessor. The letters C6 are printed above it and 13 is below it.
7. Attach (piggy-back) another 270,000 resistor on to R413. (Scan Mod)  
A very small resistor is required. If you use a 1/8 watt or larger use wire rap wire to mount it our of the way.
8. Reassemble the radio.
9. Reset the microprocessor. (ser#<34000 Push button next to lithium battery, on >34000 Hold [FUNCTION] and turn power on

Note Adjust VCO for .8 VDC at lowest desired Freq. Measure at VCO test point, tip of resistor R253.

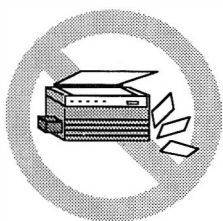
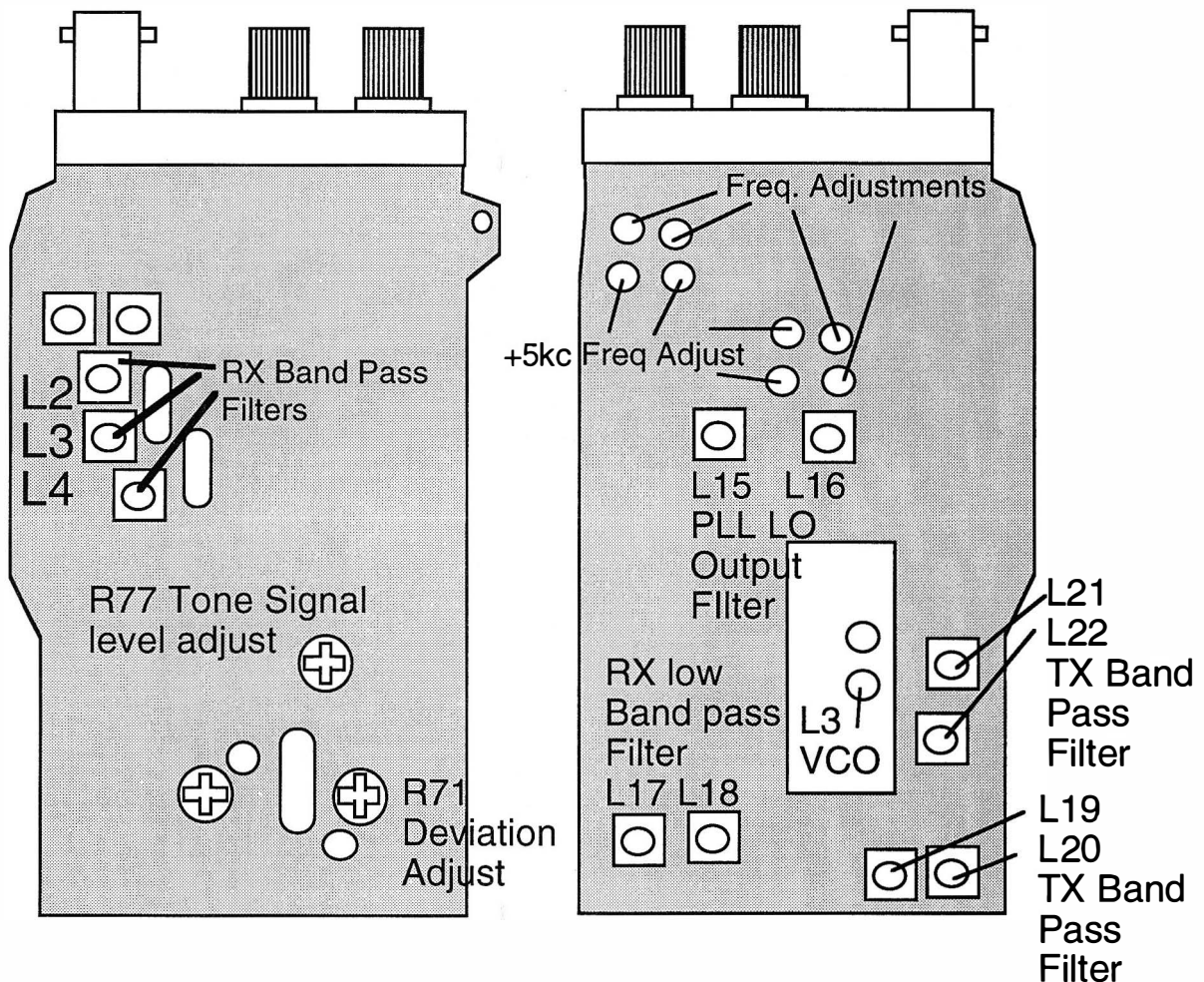


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-2A/AT

## ALIGNMENT CONTROLS



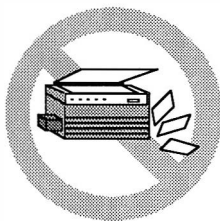
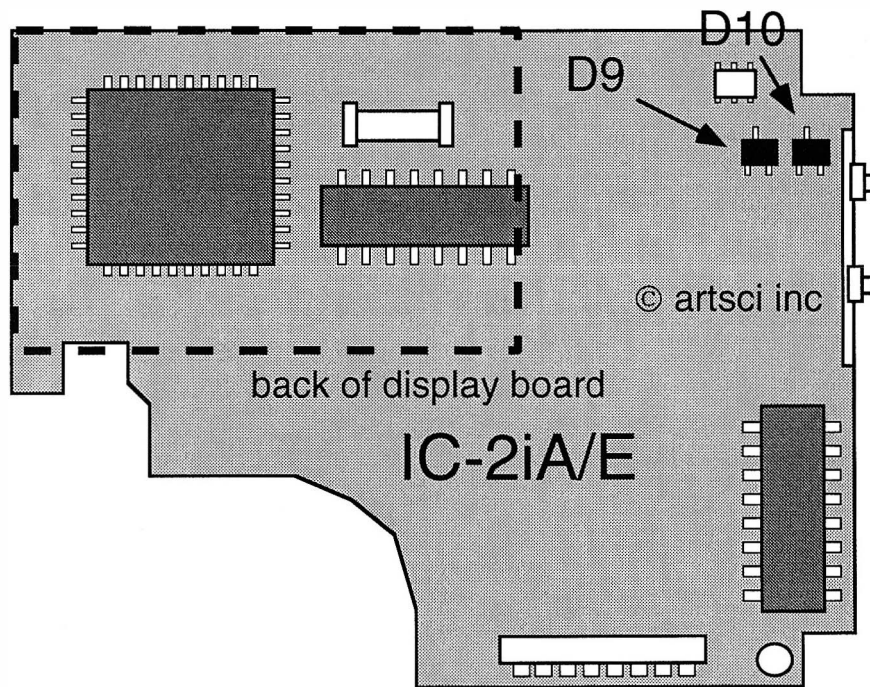
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-2iA/E

EXPANDED RF  
118-136 MHz AM Receive  
136-174 MHz TX/RX

1. Remove battery and antenna.
2. Remove screws and open radio.
3. Locate and remove chip diode D9. (Be careful, do not over heat or lift traces)
4. **Install a Chip diode in position D10.** (MA132K - ICOM part # 1790000820)
5. Reassemble the radio.
6. Reset the microprocessor, if needed (see users manual for reset instructions)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

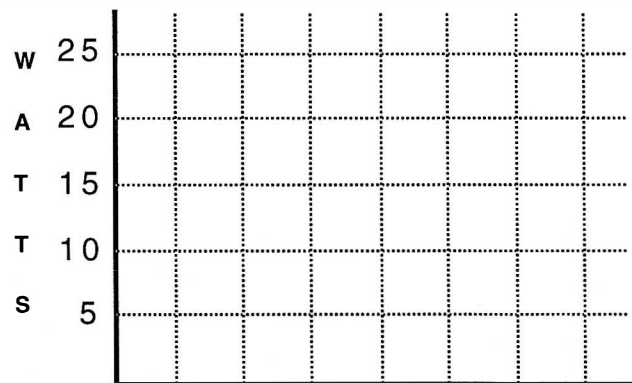
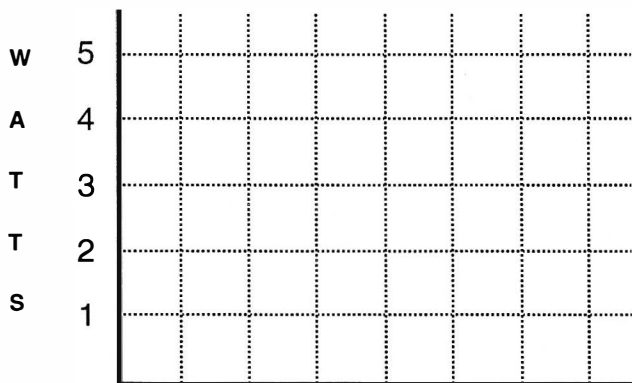
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

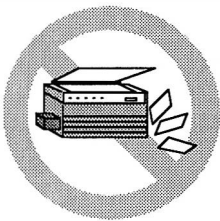
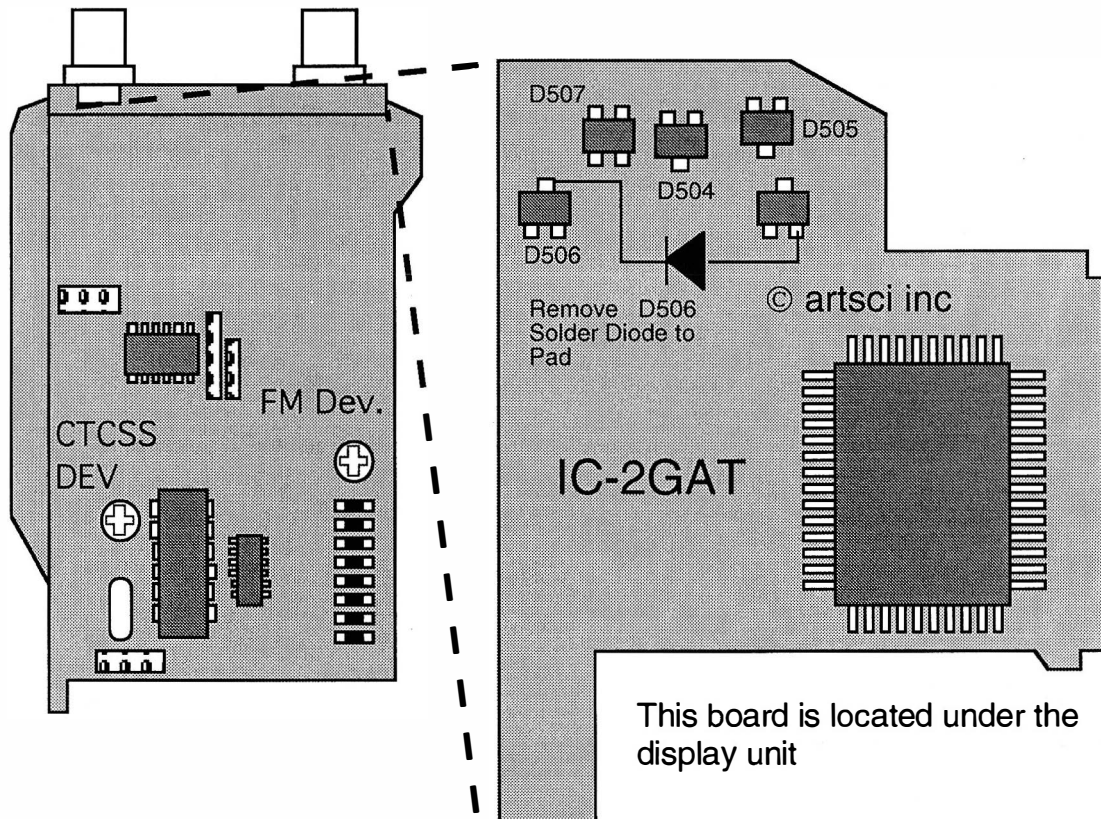
| Description                     | Before      | After       |
|---------------------------------|-------------|-------------|
| Power out (Low)                 | _____ Watts | _____ Watts |
| Power out (High)                | _____ Watts | _____ Watts |
| Frequency Error (Simplex)       | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)        | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band)  | _____ uv    | _____ uv    |
| Receive Sensitivity (_____ MHz) | _____ uv    | _____ uv    |
| Receive Sensitivity (_____ MHz) | _____ uv    | _____ uv    |
| PL Deviation                    | _____ Hz    | _____ Hz    |
| DTMF Deviation                  | _____ KHz   | _____ KHz   |
| Audio Deviation                 | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr     | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |



# ICOM IC-2GAT

## EXPANDED RF

1. Remove battery and antenna.
2. Remove screws and open radio
3. **Remove D506** (this part is already removed on US version)
4. Attach diode as shown (Use 1N914 or equivalent Diode)  
Make sure Diode leads will not short anything. Cover them in tape.
5. Reassemble the radio
6. **Reset the radio.** (Turn radio on, Hold [LIGHT] & [FUNCTION], turn radio off and back on)



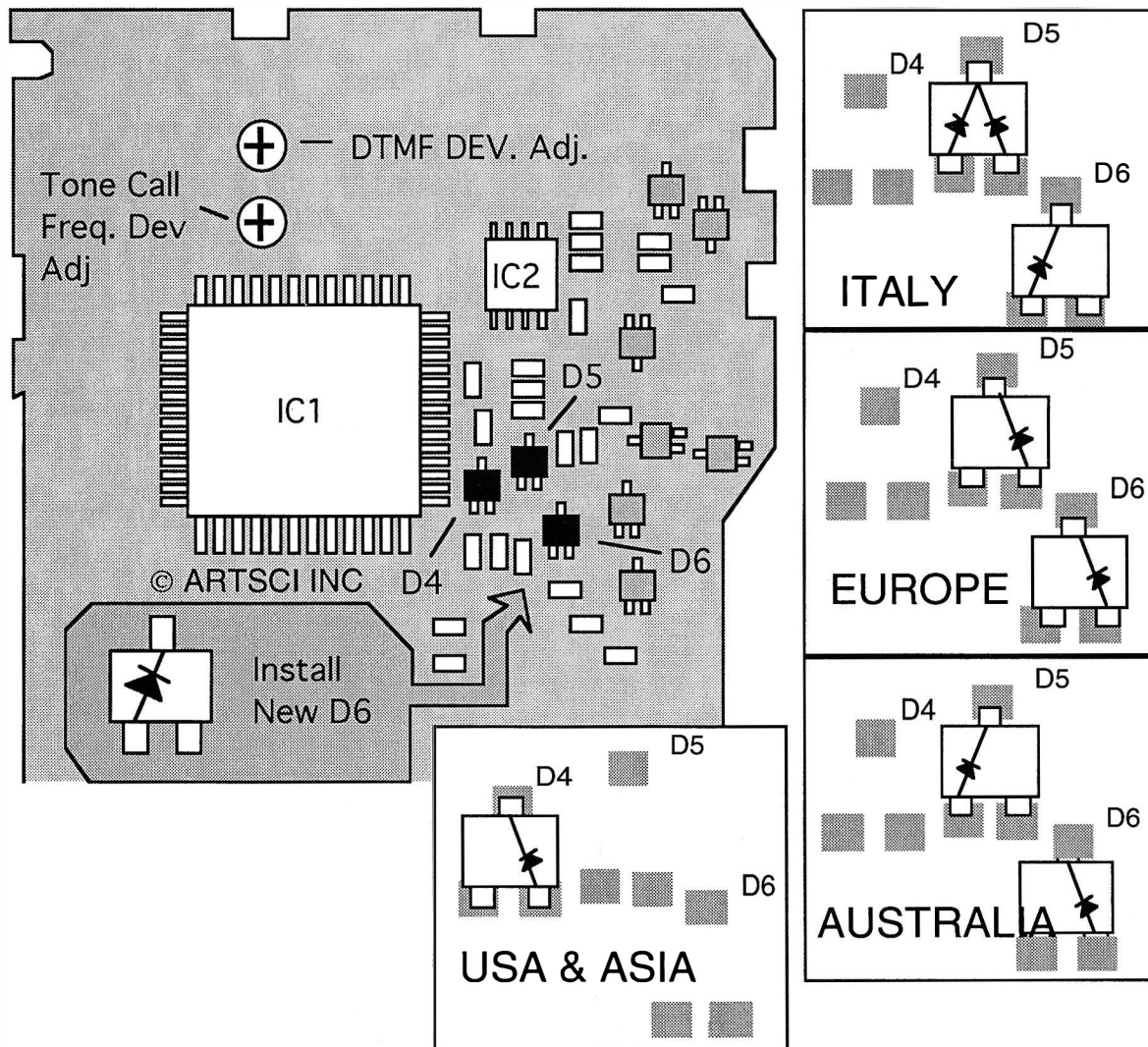
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

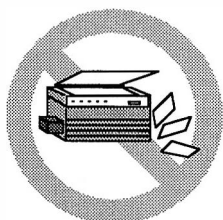
# ICOM IC-2SA, 2SAT & 3SAT

## EXPANDED RF

1. Remove battery and antenna.
2. Remove screws and open radio.
3. Locate and **remove diode D9** on LOGIC A unit (Already removed on USA version)
4. **Remove chip diode D6.** (Already removed on USA version)
5. Solder **install a chip diode (DA114 ) in place of D6 position.**  
A 1N4148 or other diode can be used if extreme caution is taken.
6. Reassemble the radio.
7. **Reset the microprocessor.** (2SAT: Press & hold [#], [B] & Light, Turn power on)



MORE ----



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

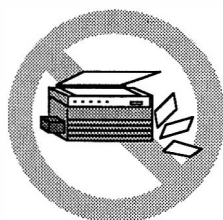
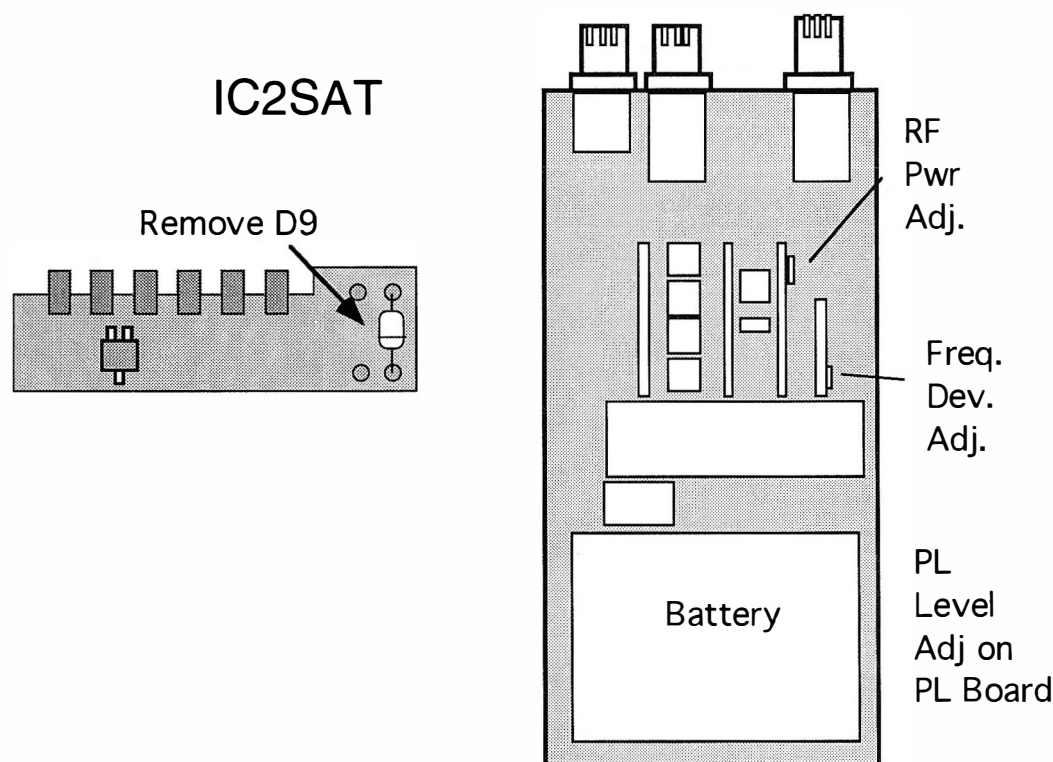


# ICOM IC-2SA, 2SAT & 3SAT

## ALIGNMENT POINTS

2SAT Range RX 108-140 AM, 138-169 FM, 310-370 FM TX 139 - 163 FM

Optional Commands: Push [LAMP] & [Keyboard Key, see below] and Power on.  
 [1] Enter 4 digits, [2] Enter 5 digits, [3] Enter 6 digits,  
 [4] Pause Scan, [5] to see timer scan, [7] PS off  
 [8] PS 1:4 125 msec on/500msec off, [9] PS 1:16  
 [0] PTT Disable, [\*] PTT Enable, [#] PTT Disable  
 [A] Reset, [D] Display Test



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

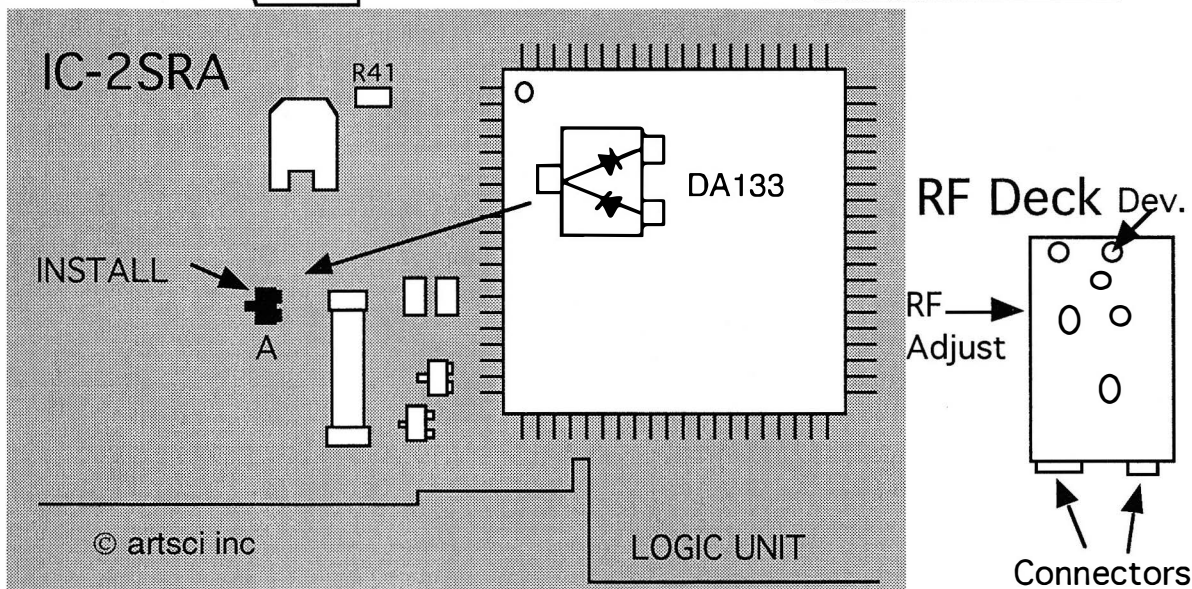
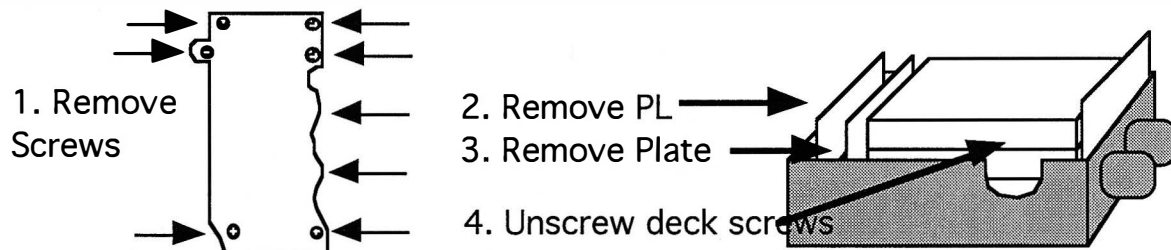
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## ICOM IC-2SRA

### EXPANDED RF

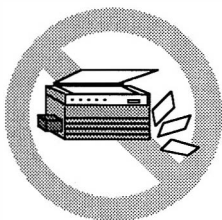
1. Remove battery and antenna.
2. Remove screws from back panel and battery plate and open radio.
3. Remove PL deck and power plate.
4. Unplug VHF & Receiver decks.
5. **Attach Chip diodes to location point D16** point A (MA133).  
(Diode MA133 - ICOM part # 1790000860)
6. Reassemble the radio.
7. **Reset the CPU** (Push and hold [FUNCTION] & [A] & [CLR] and turn radio on)



#### IC-2SRA KEYBOARD COMMANDS:

RX Expansion      Push and hold [CALL] & [F] & [LIGHT] and turn power on.  
D9 on "RES" board may need to be removed

RANGE:            126 - 190 MHz



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

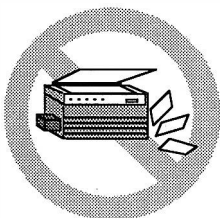
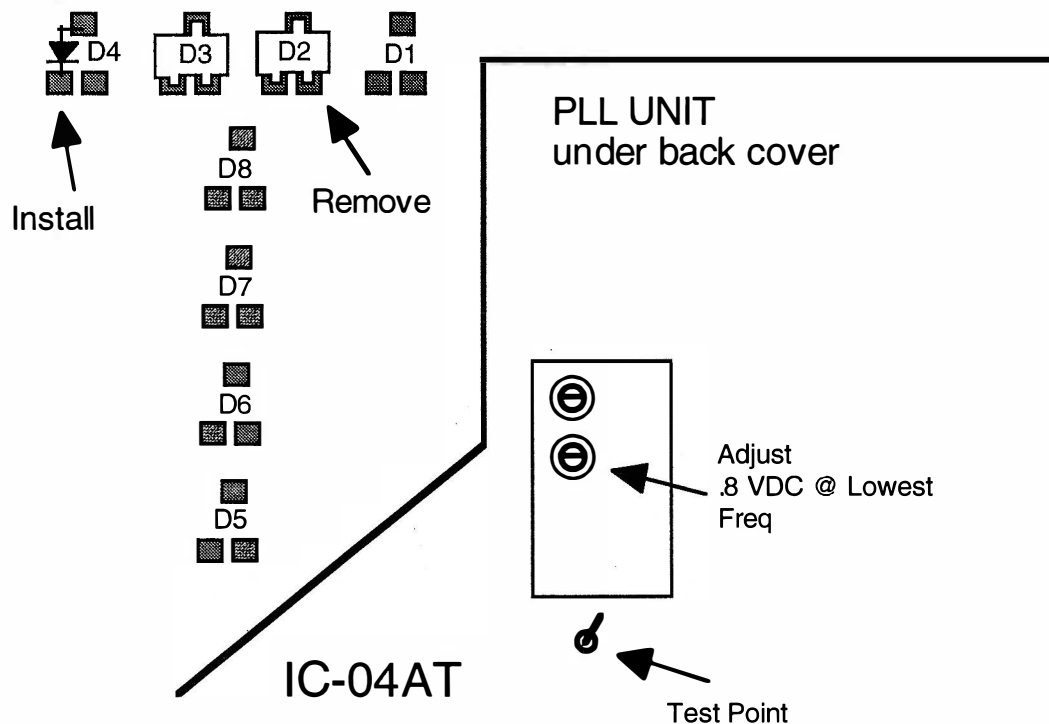
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-04AT

## EXPANDED RF

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and remove chip diode D2 on Logic unit.
4. On 02's with ser # over 34,000 - Install a diode across pads of diode D4 (see drawing) 1N4148 or 1SS211
5. On serial #'s below 34,000 install three diodes. (see drawing)
6. Reassemble the radio.
7. Reset the microprocessor. (ser#<34000 Push button next to lithium battery, on >34000 Hold [FUNCTION] and turn power on

Note Adjust VCO for .8 VDC at lowest desired Freq. Measure at VCO test point.



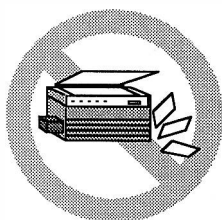
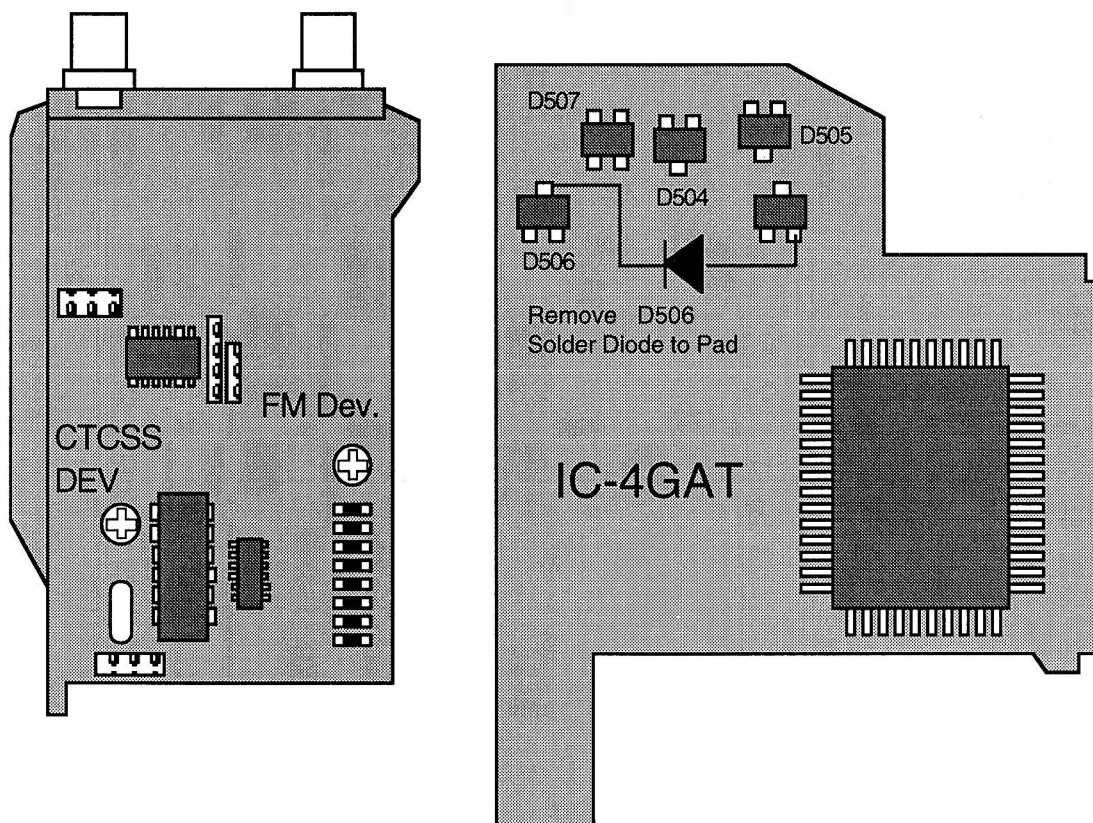
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-4GAT

### EXPANDED RF

1. Remove battery and antenna.
2. Remove Screws and open radio
3. **Remove D506** (this part is already removed on US version)
4. **Attach Diode as shown** (Use 1N914 or equivalent Diode)  
Make sure Diode leads will not short anything. Cover them in tape.
5. Reassemble the radio.
6. **Reset Radio.** (Turn radio on, Hold [LIGHT] & [FUNCTION], turn radio off and back on)



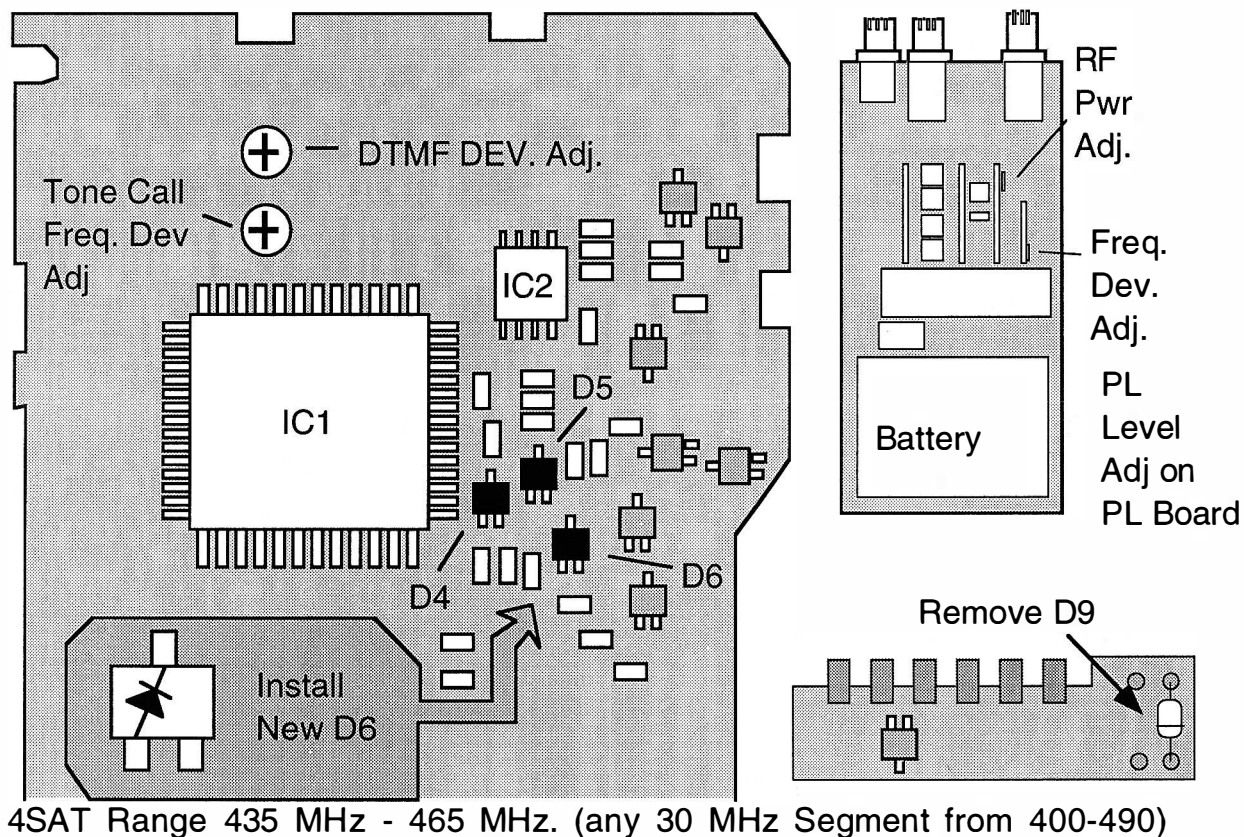
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

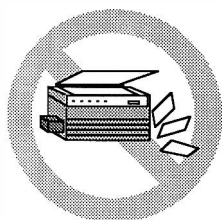
# ICOM IC-4SAT

## EXPANDED RF

1. Remove Battery and antenna.
2. Remove Screws and open radio.
3. Locate and **remove diode D9** on LOGIC A unit (See Drawing)
4. Solder **install a chip diode (DA114 T107) in position D6.**  
A 1N4148 or other diode can be used if extreme caution is taken.
5. Reassemble the radio.
6. **Reset the microprocessor.** (Press & hold [#], [B] & Light, Turn power on)



Optional Commands: Push [LAMP] & [Keyboard Key, see below] and Power on.  
 [1] Enter 4 digits, [2] Enter 5 digits, [3] Enter 6 digits,  
 [4] Pause Scan, [5] to see timer scan, [7] PS off  
 [8] PS 1:4 125 msec on/500msec off, [9] PS 1:16  
 [0] PTT Disable, [\*] PTT Enable, [#] PTT Disable  
 [A] Reset, [D] Display Test

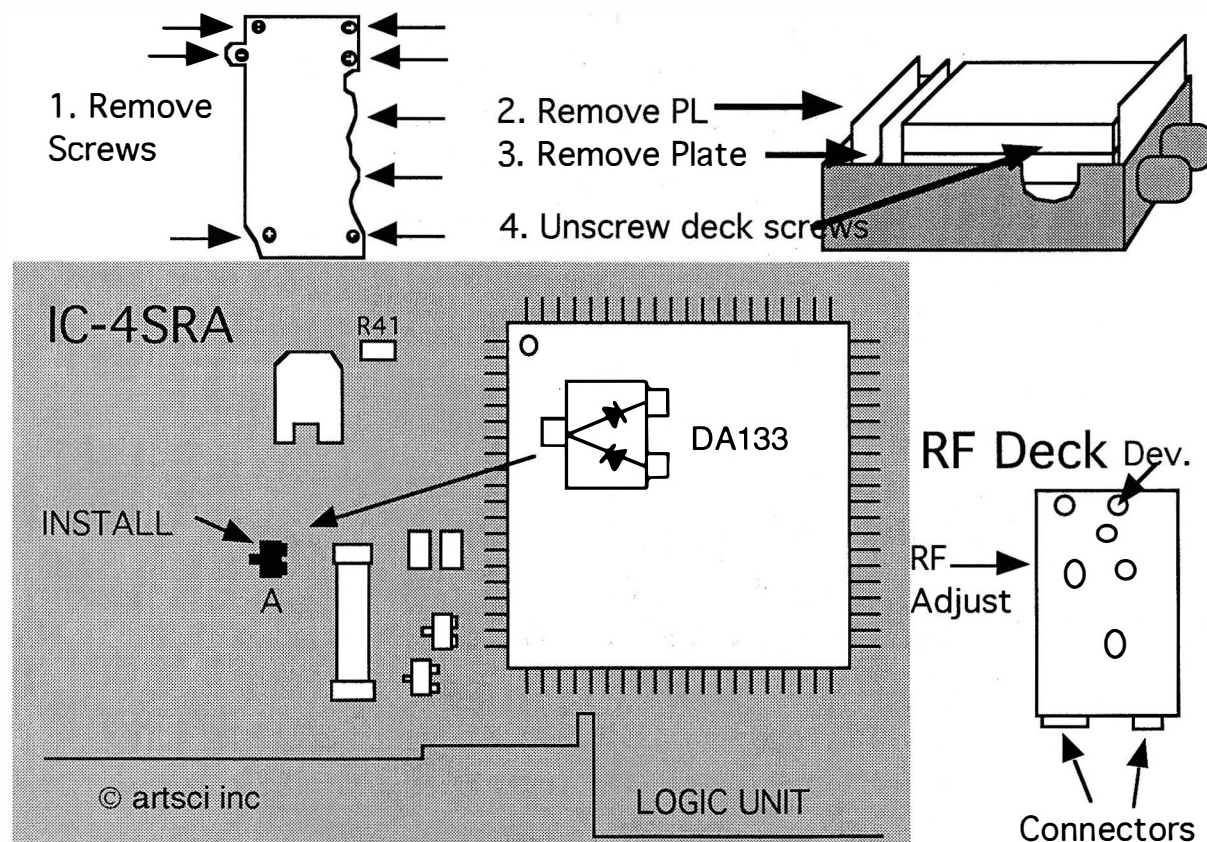


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
 HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any  
 modified radio may be a violation of FCC rules. Some modifications have not been  
 tested. The Author, Publisher and all other parties takes NO responsibility or liability  
 for any damage or violation resulting from these modifications.  
 If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

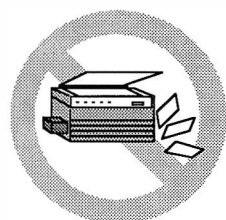
## ICOM IC-4SRA EXPANDED RF

1. Remove battery and antenna.
2. Remove screws from back panel and battery plate and open radio.
3. Remove PL deck and power plate.
4. Unplug VHF & Receiver decks.
5. **Attach Chip diodes to location point D19** point A (MA133).  
(Diode MA133 - ICOM part # 1790000860)
6. Reassemble the radio.
7. **Reset the CPU (Push and hold [3] & [B] [#] and turn on**  
(Push and hold [FUNCTION] & [A] & [CLR] and turn radio on)



### IC-2SRA KEYBOARD COMMANDS:

RX Expansion      Push and hold [CALL] & [F] & [LIGHT] and turn power on.  
D9 on "RES" board may need to be removed



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

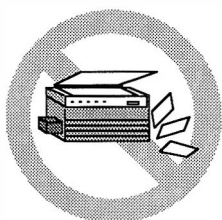
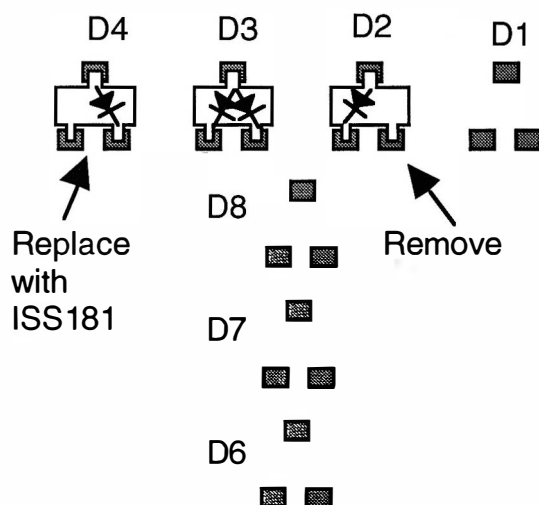
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-12AT

## EXPANDED RF

1. Remove battery and antenna.
2. Remove Screws and open radio.
3. Locate and **remove diode D2** (See Drawing)
4. Replace diode D4 with ISS 181 (A3)
5. Reassemble the radio.
6. **Reset the microprocessor.** ( Hold [FUNCTION] and turn power on)

### IC-12AT

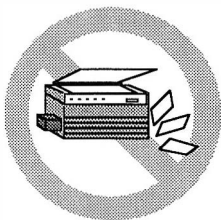
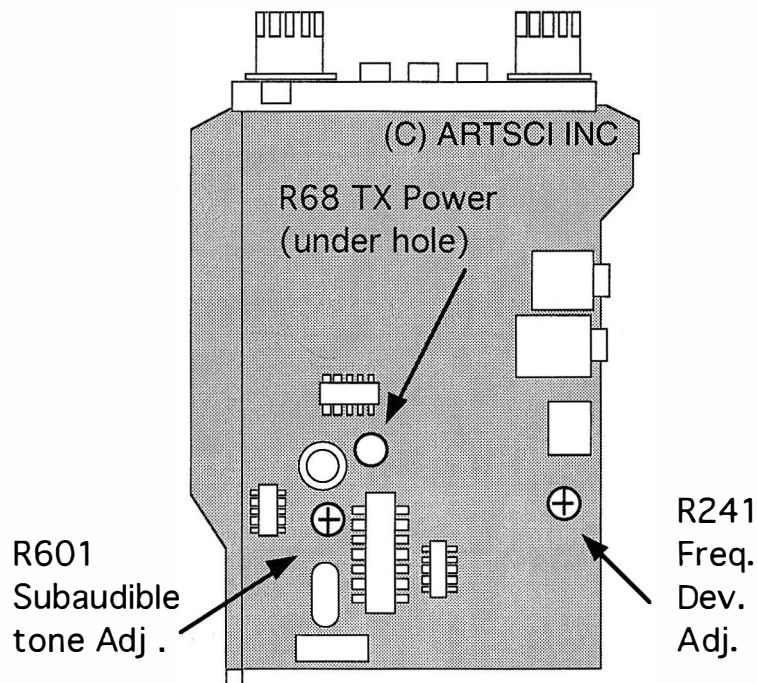


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-12GAT

## ALIGNMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

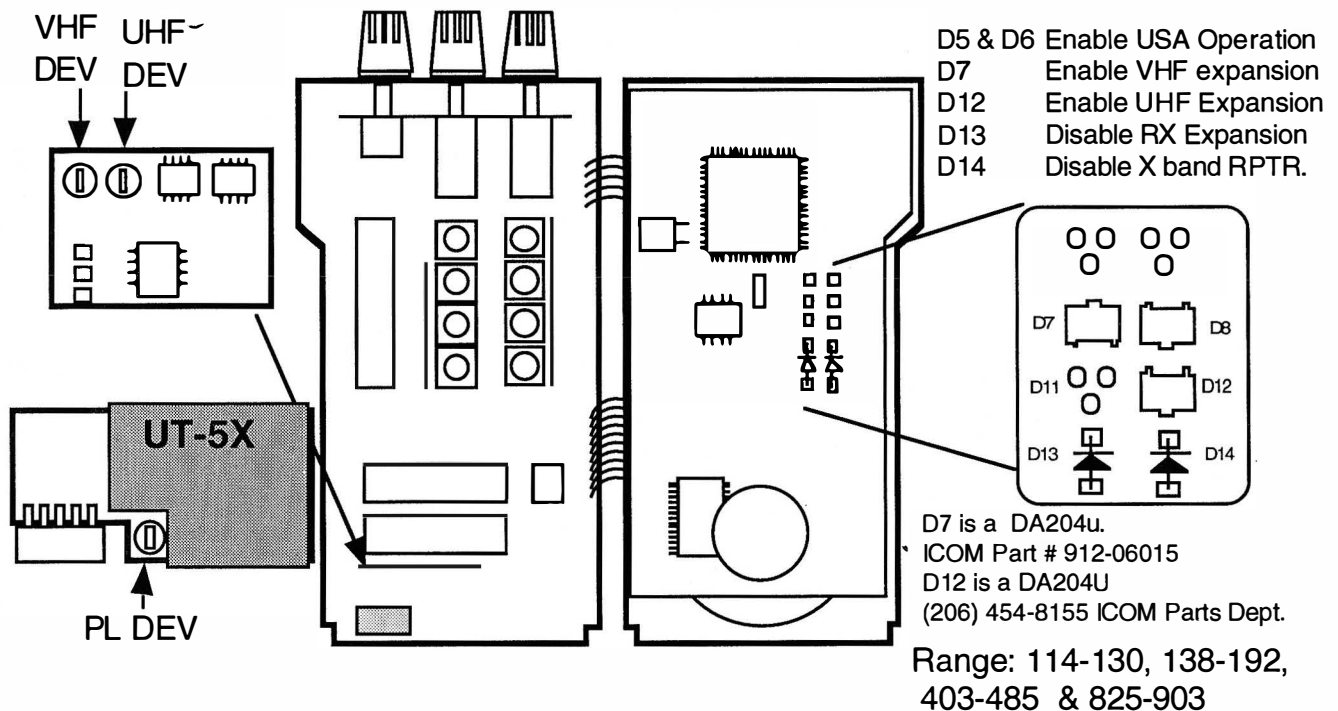
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# ICOM IC-24

## EXPANDED RF/ Crossband Repeater

1. Remove battery and antenna
2. Remove Screws and open radio
3. **Remove Diode D8.**
4. **Remove Diode D14** (Crossband Repeater)
5. **Remove Diode D13** (Expanded RX)
6. **Attach Diode DA204u to position D7**
7. **Attach Diode DA202u to position D12.** Note some models require a DA204u.
8. Reassemble the radio.
9. **Reset the microprocessor.** Press and hold [light] & [B] & [#] and turn power on.  
Note: Press and hold [light] & [3] and turn power on for direct Freq. entry.  
[light] & [2] will reset the radio for 10MHz input operation.

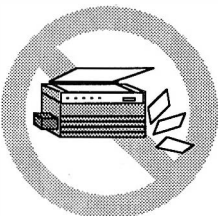


## CROSS BAND REPEATER PROCEDURES (VFO MODES ONLY)

**TURN ON** - HOLD [FUNCTION] & PRESS [C] THEN [5] THEN [D]

**TURN OFF** - HOLD [FUNCTION] & PRESS [D]

Note: When Transmitting in the 825-900MHz range, the unit is simultaneously transmitting in the 400-450MHz band!!



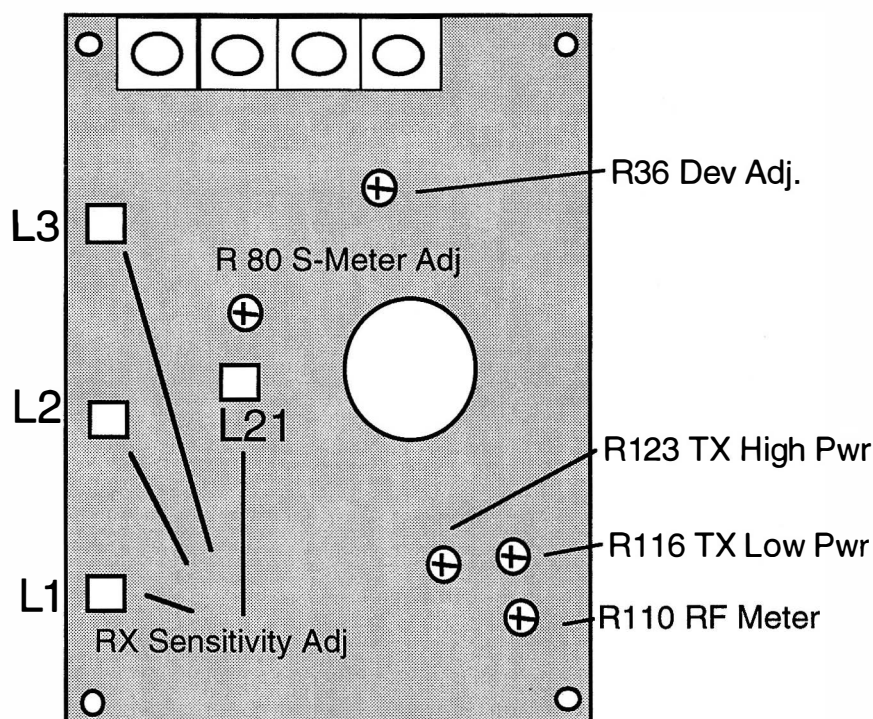
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-25

### EXPANDED RF (keyboard mod)

1. Set offset to 0.0
2. Select VFO (A).
3. Press and hold [SIMP/DUP] and [NOR/REV].
4. Dial in desired frequency.
5. Release [SIMP/DUP] button.
6. Select the other VFO (B).
7. Repeat steps 3, 4 and 5  
If VFO (B) can not be set, transfer VFO (A) to VFO (B) using the [WRITE] button as described on page 7, item 6, of the owners manual.  
(NOTE: [SIMP/DUP] button must be out when the VFO is changed)
8. If the tuning knob is turned again, the radio will revert back within the normal band range.

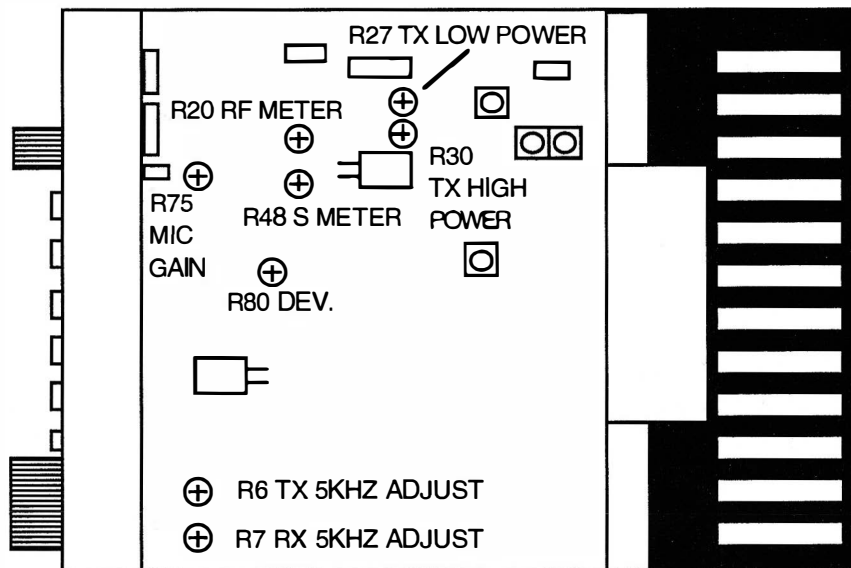


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

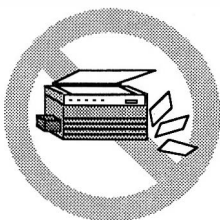
# ICOM IC-27A & H

## ADJUSTMENT CONTROLS



CPU Reset by pressing the Reset button under the access cover

Note: There is no way to add offset to IC-27 D boards



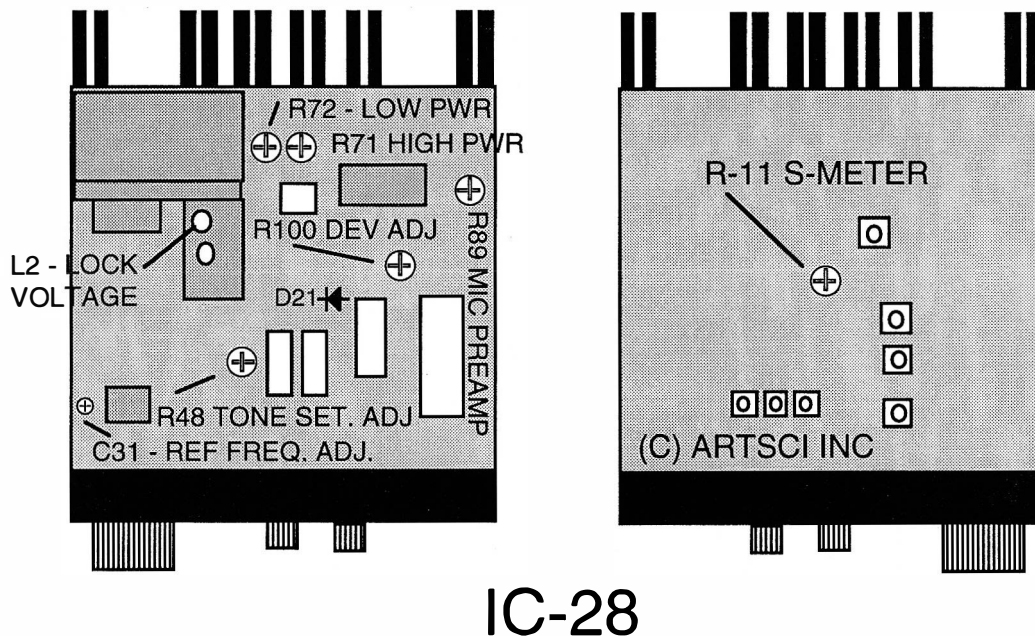
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

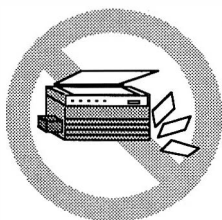
## ICOM IC-28A & H

### EXPANDED RF

1. Remove Power and Antenna.
2. Remove screws and open case.
3. Locate and **cut Diode D21** inside the top of the circuit board.
4. **Reset the Microprocessor.** (insert a toothpick in hole located in corner of bottom cover.)
5. Reassemble the radio.



IC-28



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

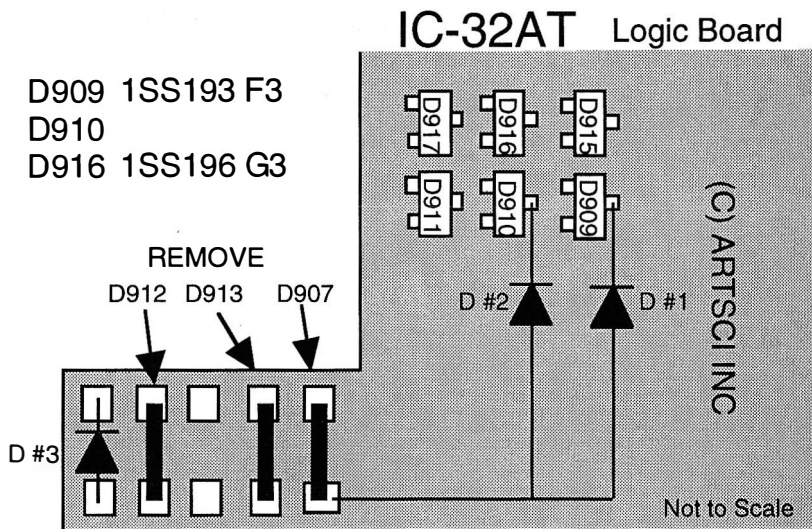
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-32AT

## EXPANDED RF / CROSS BAND REPEATER/ 10 MHz ENTRY

1. Remove battery and antenna.
2. Remove Screws and open radio.
3. **Remove D907** (150MHz+) (this part is already removed on US version)
4. **Add Diode #1** (1N914).
5. **Remove D913** (450MHz+).
6. **Add Diode #2** (1N914).
7. **Add diode #3** (1N914) 10 MHZ.
8. **Remove D912** (Repeater mod).
9. **Reset the microprocessor.**(HOLD [FUNCTION] & [A] & [LIGHT] and turn power on)
10. Reassemble the radio.

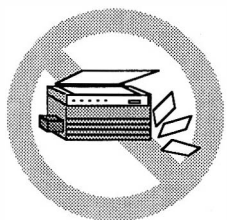
Adjust C-510 to get .25 volts at UHF test point at lowest desired frequency.  
C-510 is located in metal box. The test point is located next to the metal box.



## CROSS BAND REPEATER PROCEDURES (Simplex Freqs only)

**TURN ON** - Press & Hold [Function], Press [C] key, Press [6] key, Press [D] key.  
Release Function key.

**TURN OFF** - Press and Hold [Function], Press [D] key, Press [C] key. Release [Function]



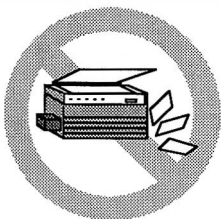
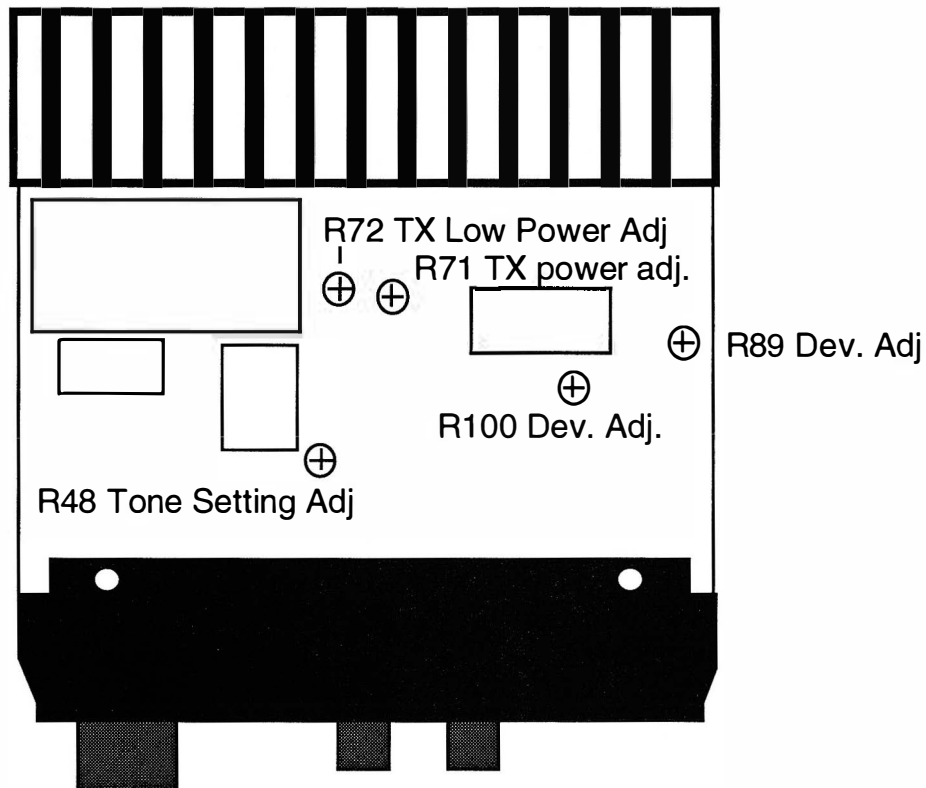
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-38

### ALIGNMENT CONTROLS

## IC-38A



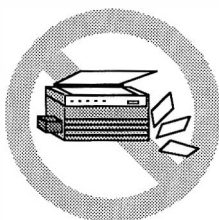
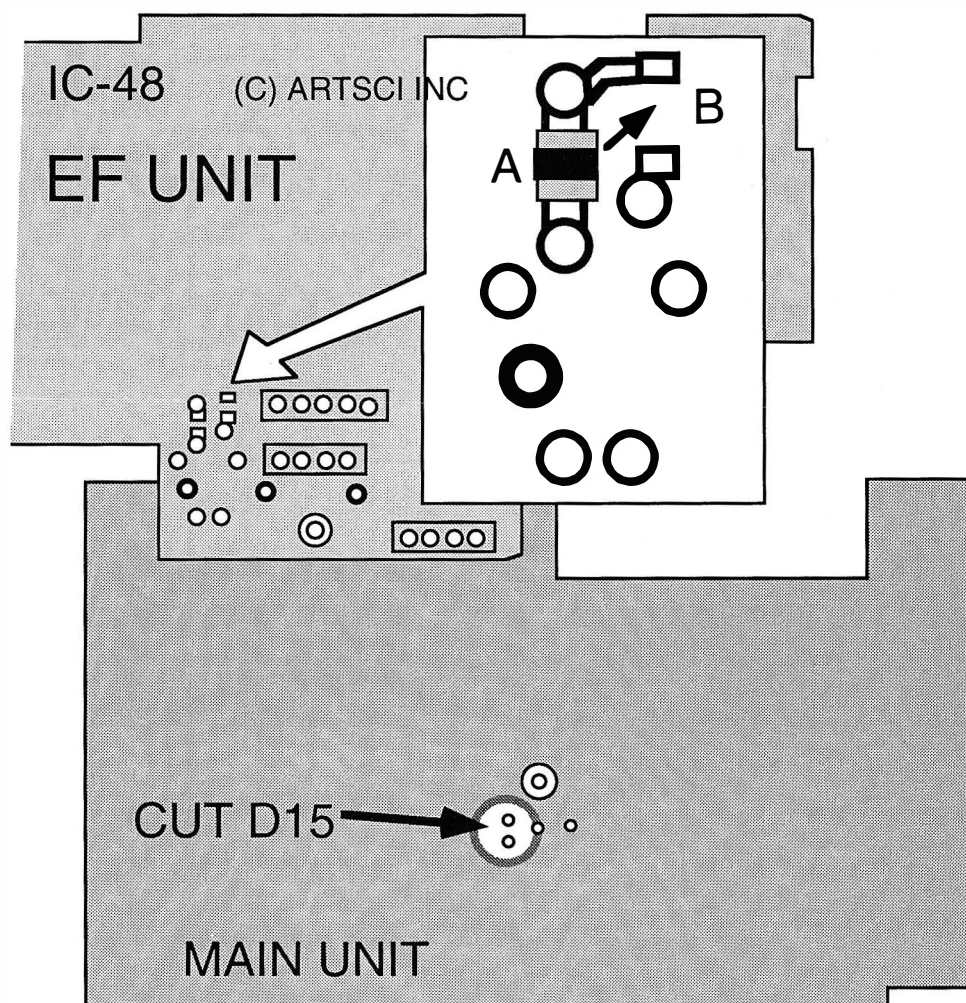
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-48A

## EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate R55 on EF unit.
4. **Move R55 from A to B.**
5. **Locate and cut D15** on the main unit.
6. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

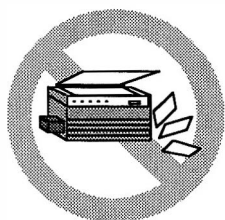
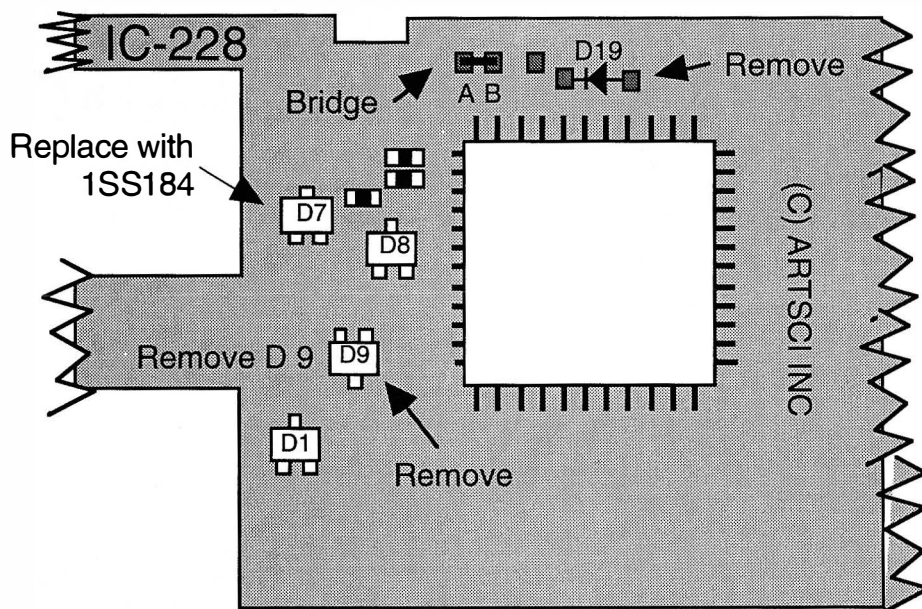
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## ICOM IC-228A

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case of the EF Unit. (Control head).
3. **Remove diode D19** (for all Serial Numbers)
4. Replace chip diode D7 with an 1SS184) ( 228A Below ser# 02900 & 228H below ser# 06300)
4. Remove chip diode D9 (228A above ser# 02900 & 228H above ser# 06300)
5. Solder bridge Pads A & B (228A above ser# 02900 & 228H above ser# 06300)
6. Reassemble the radio
7. Reset the microprocessor (Push and hold [SQUELCH/Monitor] & [LOCK] and turn power on)

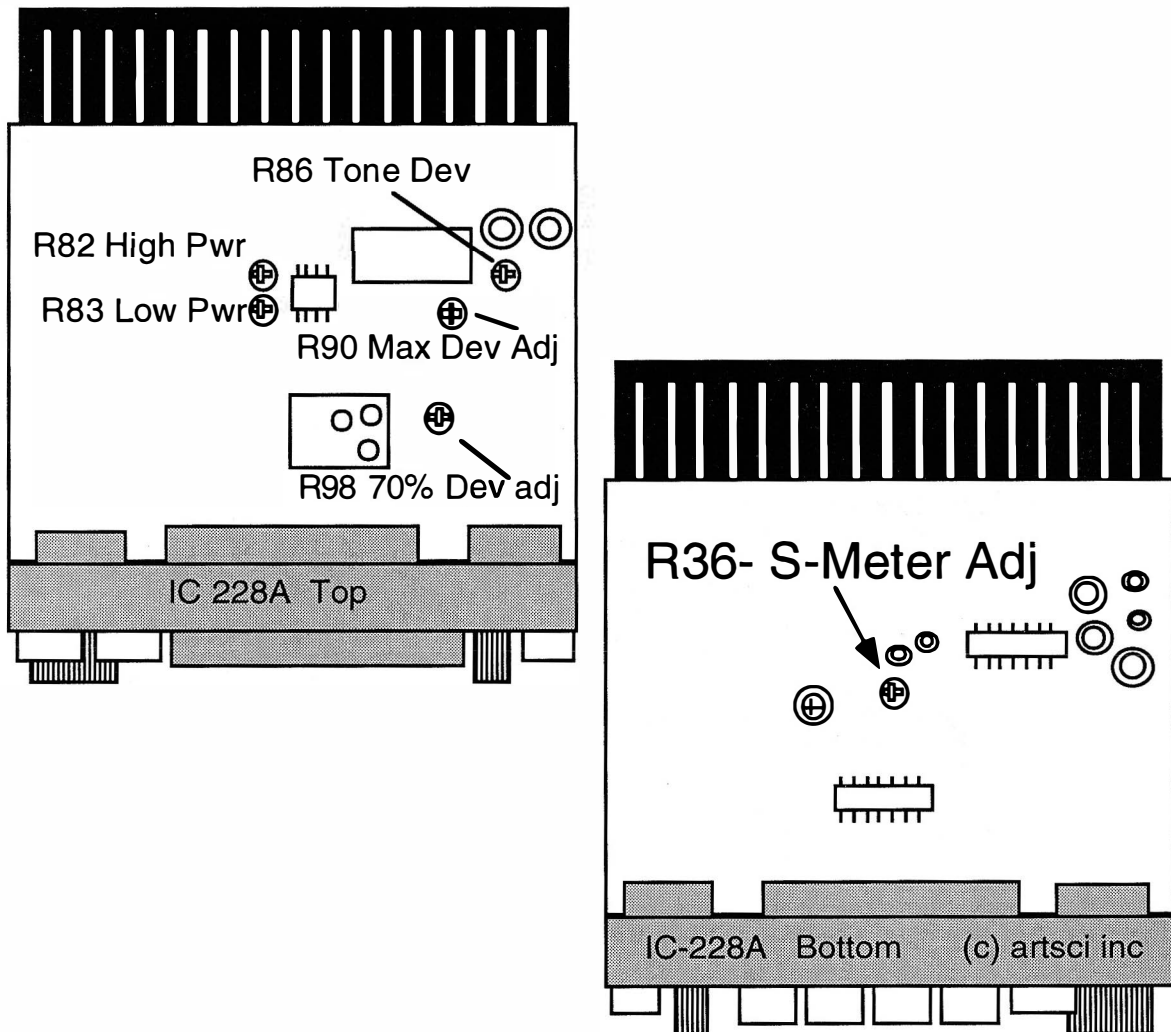


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

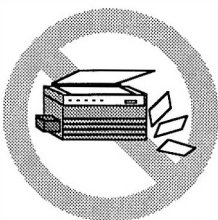
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-228A

## Alignment Points



Note : Discriminator output on pin 9 of IC 1 (MC3357P)



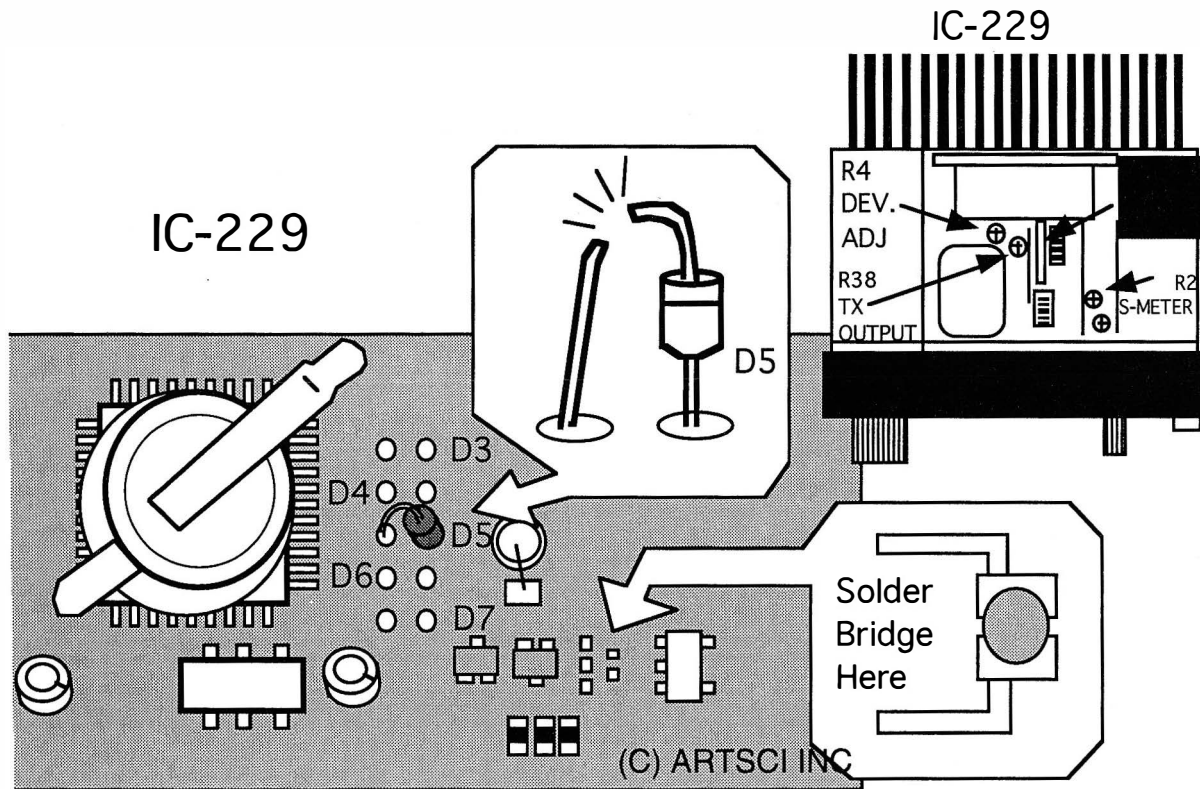
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

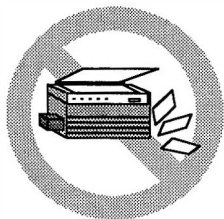
## ICOM IC-229

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate and **cut Diode D5** on the LOGIC board
4. **Install a jumper at "land" point.**
5. Reassemble the radio.
6. **Reset the microprocessor.** (Press and hold [SET] & [MW] and turn power on)



FREQ 118.000 - 135.995 MHz (AM) RX  
136.000 - 174.000 MHz (FM) RX  
  
136.000 - 174.000 MHz (FM) TX



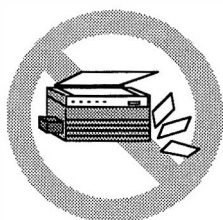
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-290

## EXPANDED RF (Keyboard mod)

1. Set the offset to 0.0
2. Select "DUPLEX" mode (+ or - ).
3. Select a VFO.
4. Press and hold the [WRITE] button.
5. Dial the desired frequency.
6. Release the [WRITE] button.
7. If desired, repeat the above steps for the other VFO.
8. Set offset back to 0.6
9. When changing frequency, remember to hold down the [WRITE] button or the display will revert back to within the normal band limits.



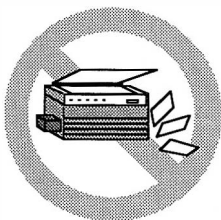
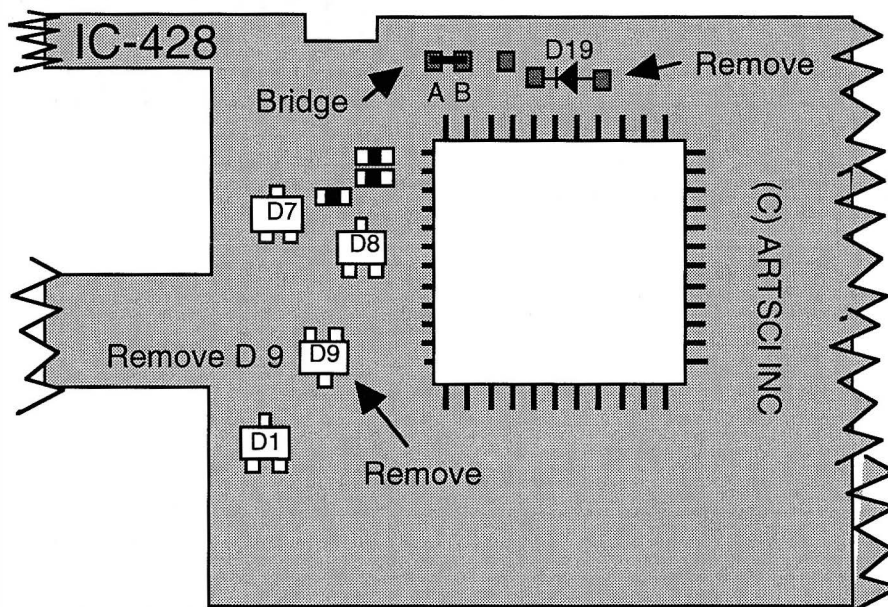
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-448A

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws and open the case.
3. **Remove diode D19**
4. **Remove chip diode D9**
5. **Solder bridge Pads A & B**
6. **Install Diode D7. (part # 1SS193)**
7. Reassemble the radio.
8. **Reset the microprocessor** (Push and hold [SQUELCH/MONITOR] & [LOCK] and turn power on.

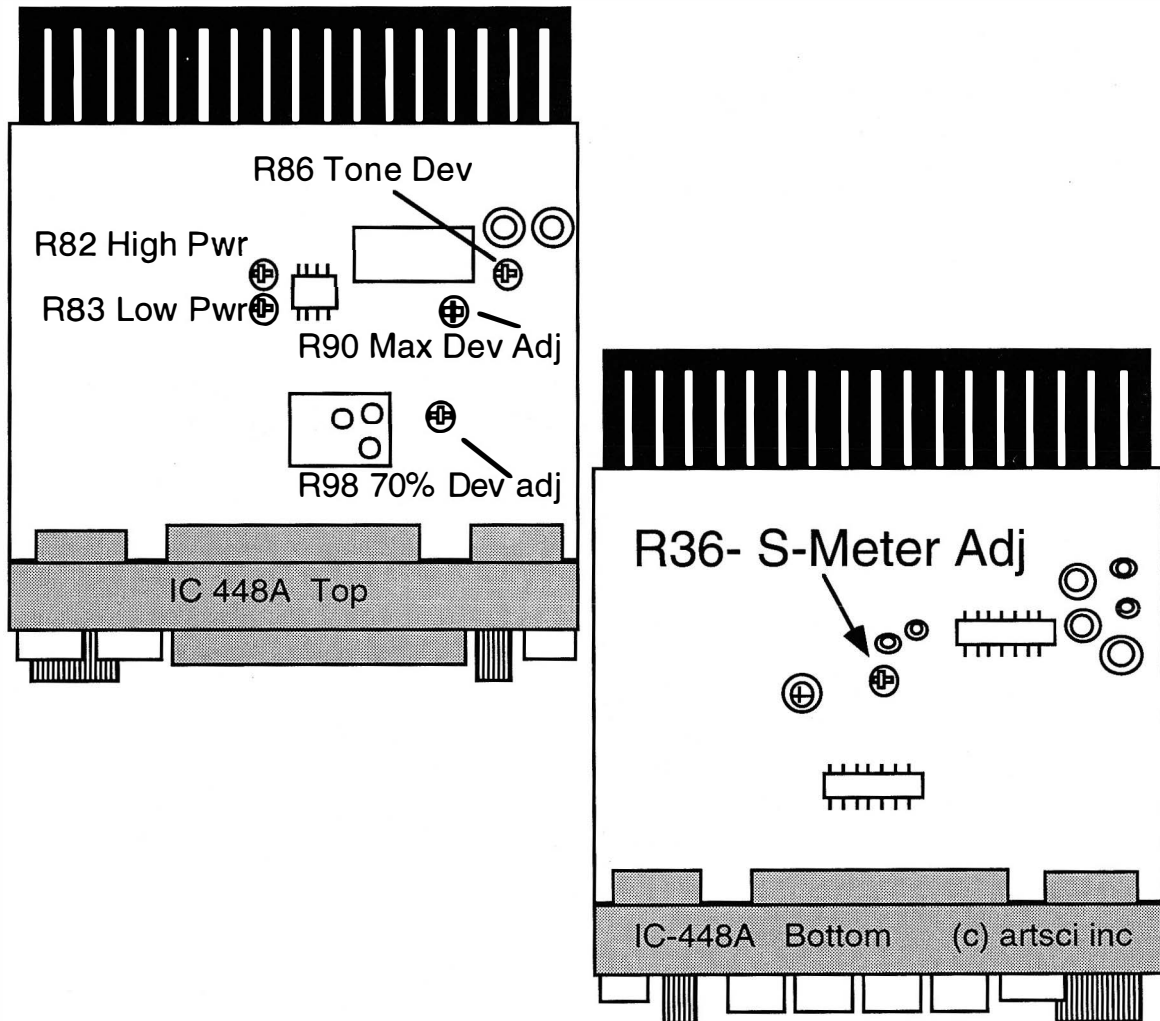


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

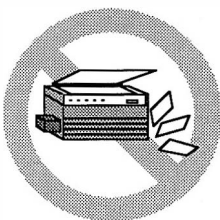
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-448A

## ALIGNMENT CONTROLS



Note : Discriminator output on pin 9 of IC 1 (MC3357P)



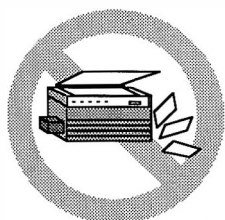
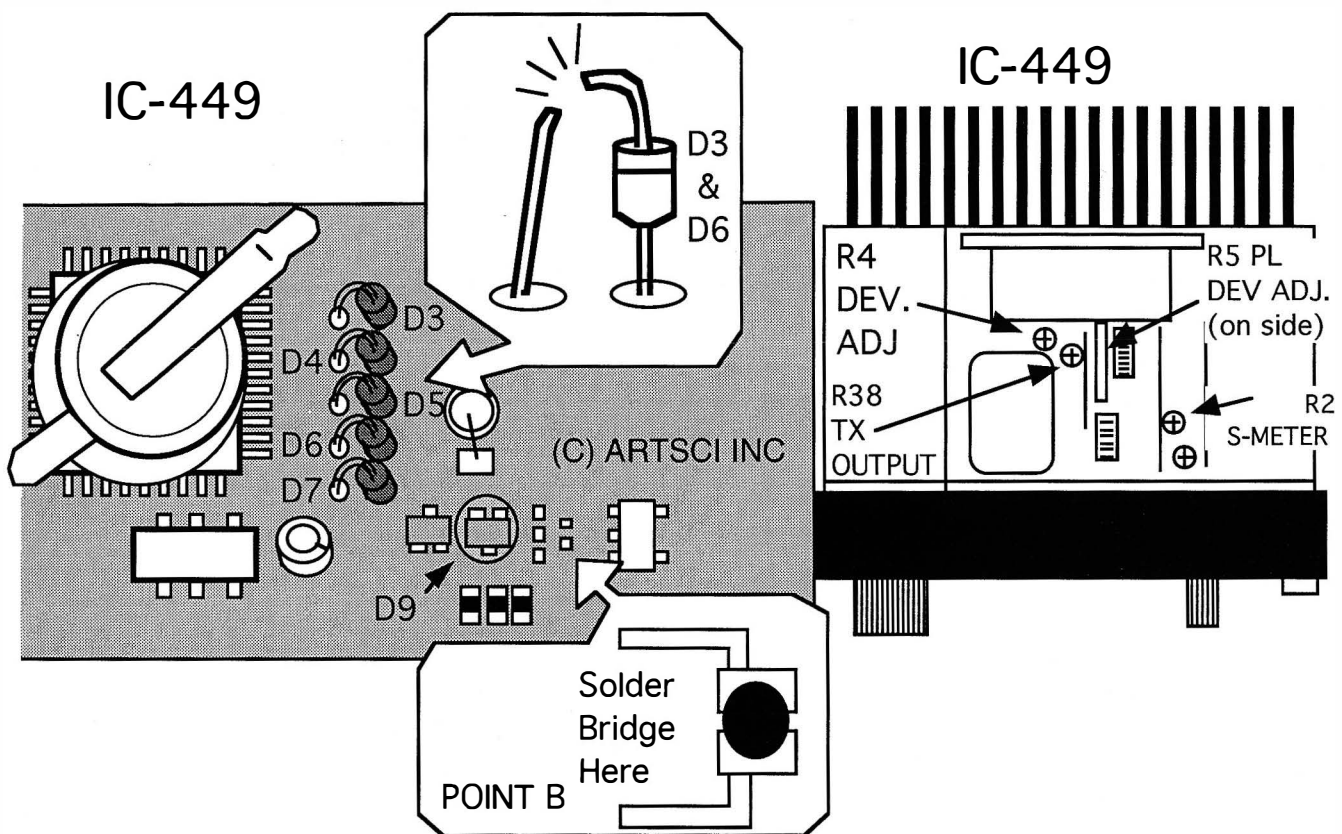
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-449

## EXPANDED RF/ ALIGNMENT CONTROLS

1. Remove power and antenna.
2. Remove screws and open the case.
3. **Locate and short "point B".**
4. **Locate and cut diode D3.**
5. **Locate and cut diode D6.**
6. **Install diode D9 (1SS187).**
7. Reassemble the radio.
8. **Reset the microprocessor** (Press and hold [SET] & [MW] and turn power on.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

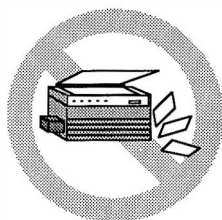
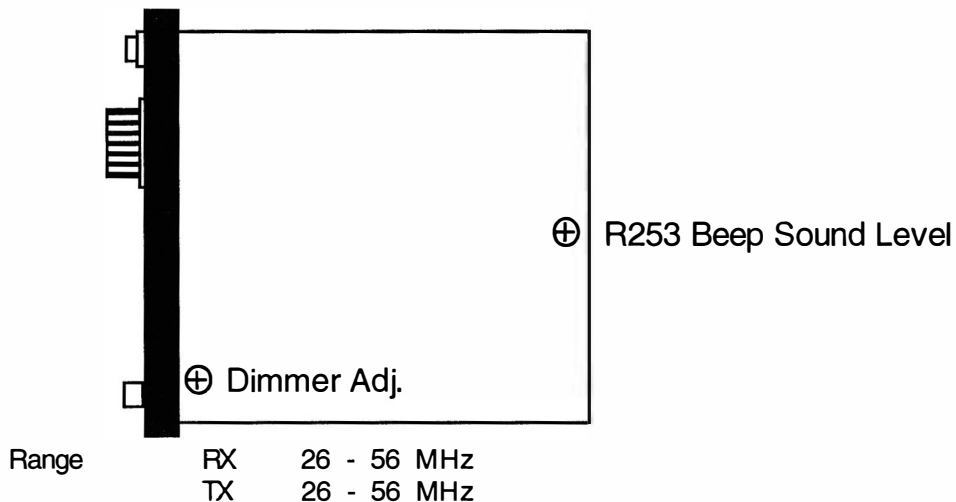
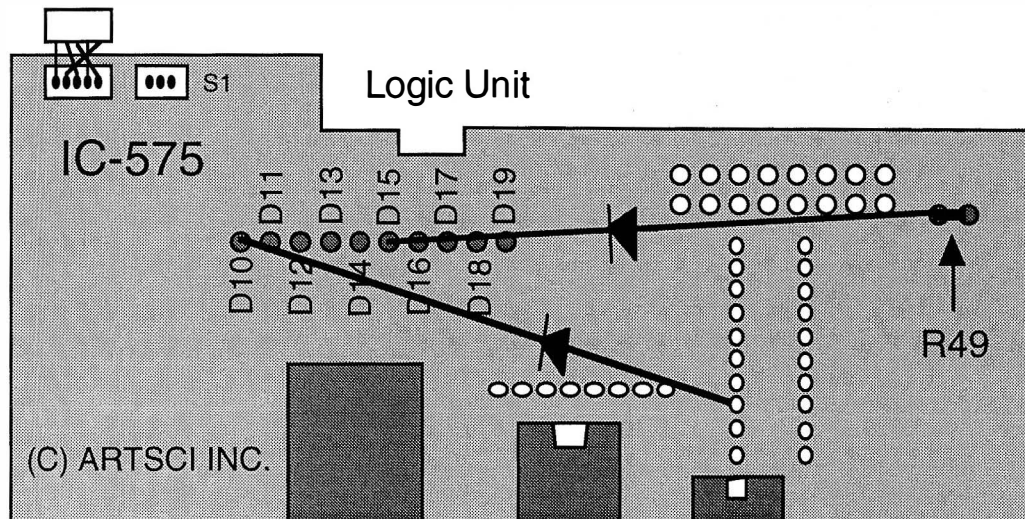
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# ICOM IC-575

## EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate the Logic Unit. It is located under the PA unit. (the PA unit has the speaker in it.) Follow the instruction used when installing the UT-34 Tone Squelch unit.
4. **Attach two diodes as shown.** (any standard diode)  
D10 to 3rd pin & R49 to D15
5. Reassemble the radio.
6. **Reset the microprocessor** (Press and hold [M-CL] and turn power on)



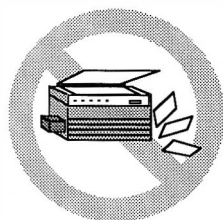
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-720A

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate main board and **cut light blue wire**, pin 1 of plug K-10
4. Reset the Microprocessor.
5. **Reassemble the radio.**



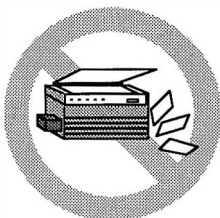
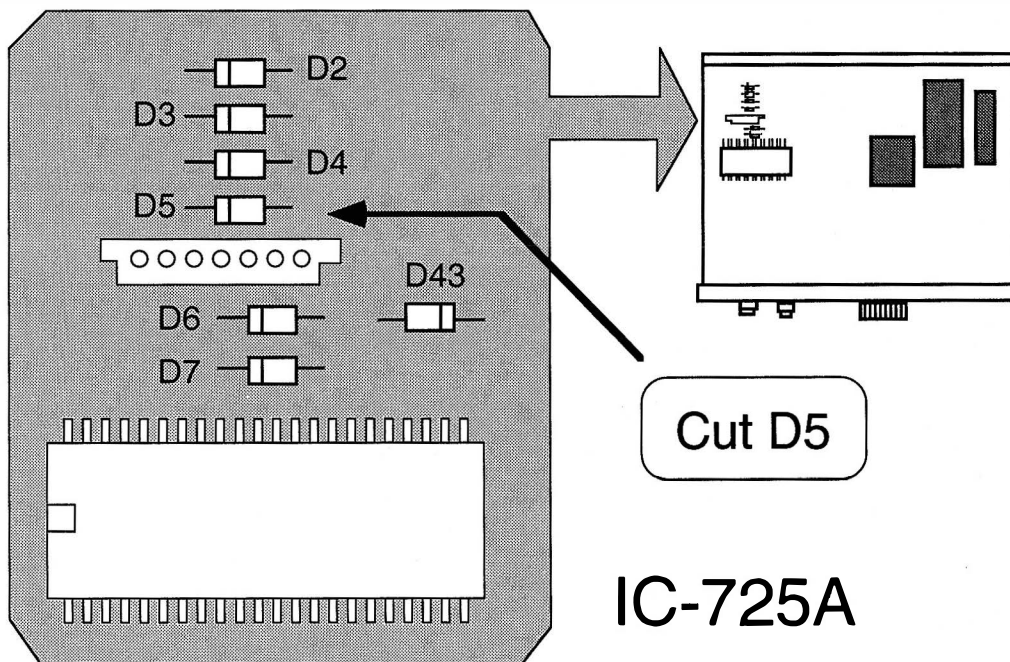
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-725A

## EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate PLL board and **cut diode D5**.
4. **Reset the microprocessor.** (Hold [FUNCTION] & [MW] and turn power on)
5. Reassemble the radio.



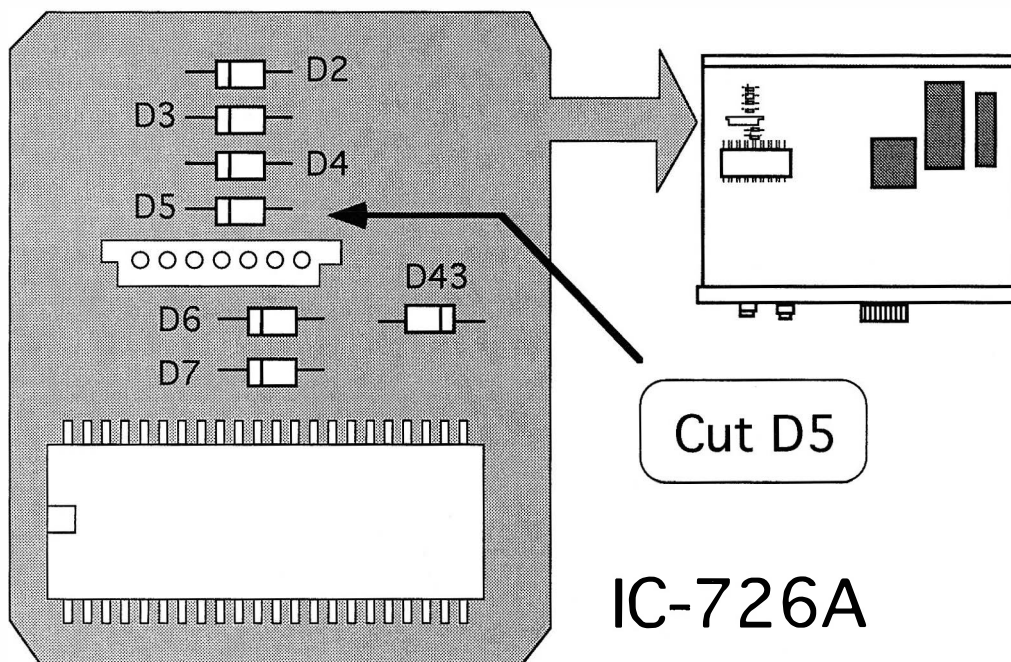
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

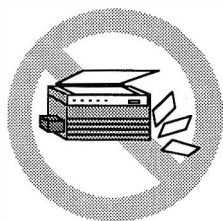
## ICOM IC-726

### EXPANDED RF

1. Remove power and antenna.
2. Remove top and bottom covers.
3. Locate PLL circuit board pictured below.
4. **Cut Diode D5.**
5. Reassemble the radio.
6. Reconnect the power.
7. **Reset the microprocessor** (Hold [FUNCTION] & [MW] and turn power on)



IC-726A



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

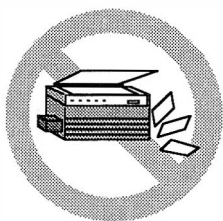
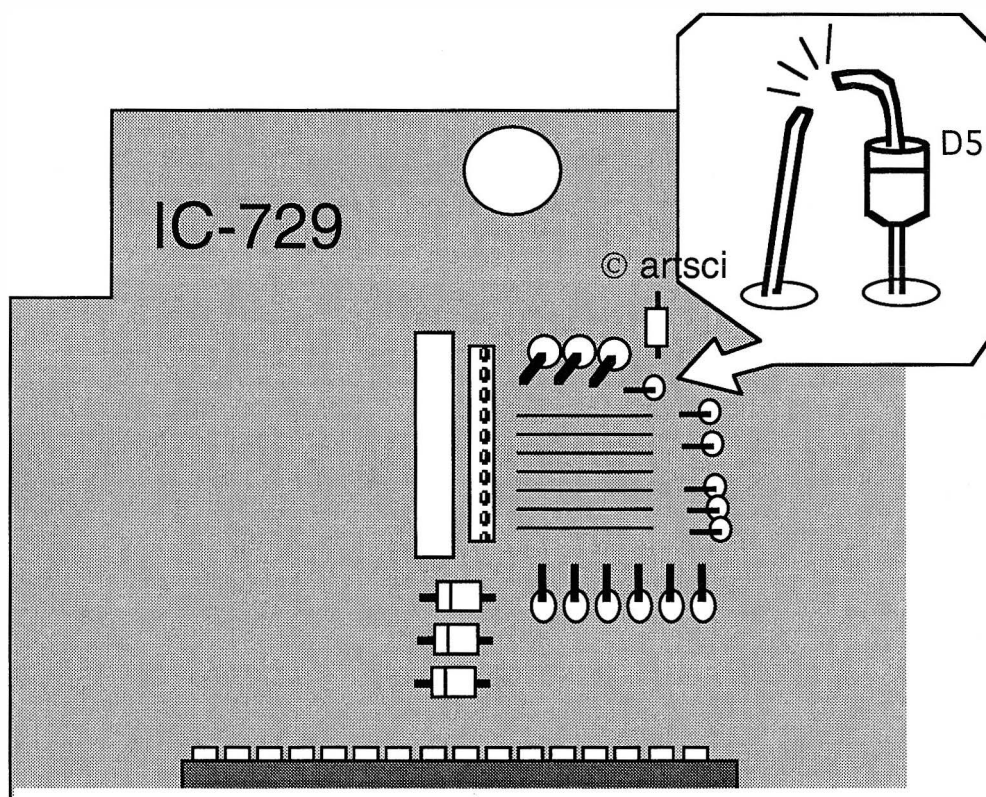
## ICOM IC-729

### EXPANDED RF

HF Expansion only.

NO 50MHz expansion available

1. Remove power and antenna.
2. Remove screws open case.
3. Locate PLL board.
4. Locate and **cut diode D5**
5. Reassemble the radio.
6. **Reset the microprocessor** ( Press & Hold [P] & [MW] and turn power on)



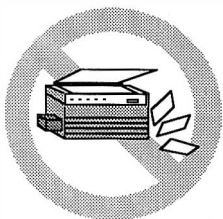
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-730

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate RF board.
4. **Cut green wire**(labeled 'D')
5. **Cut resistor R-48**
6. **Reset the microprocessor.**
7. Reassemble the radio



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

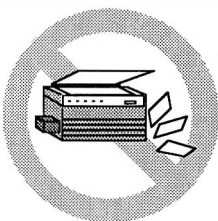
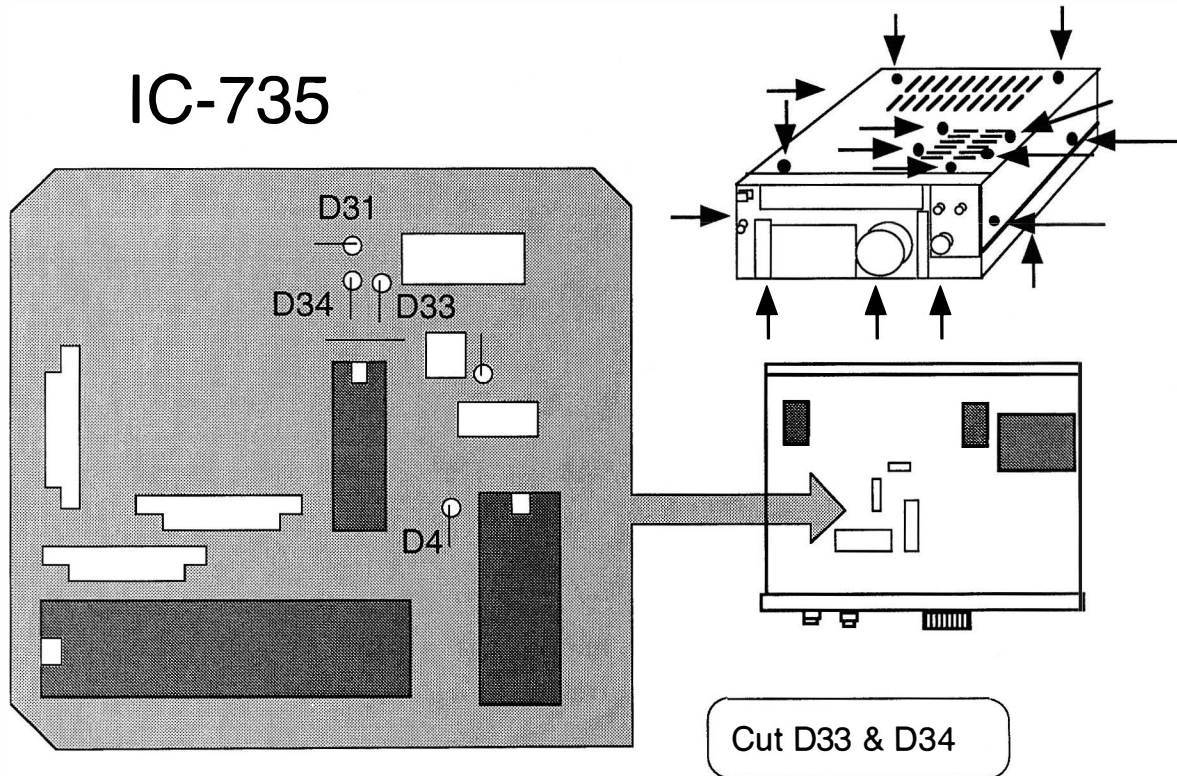
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-735

## EXPANDED RF

1. Remove power and antenna.
2. Remove screws and open top cover.
3. Remove screws and set PA unit aside.
4. Locate diodes D33 and D34 on the top of the PLL circuit board.
5. **Cut the Teflon covered leads of Diodes D33 and D34.**
6. Reassemble the radio.

Note: Accessing the main Board may require taking out many of the other components of the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

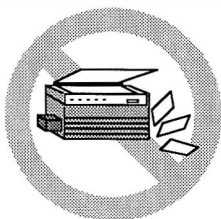
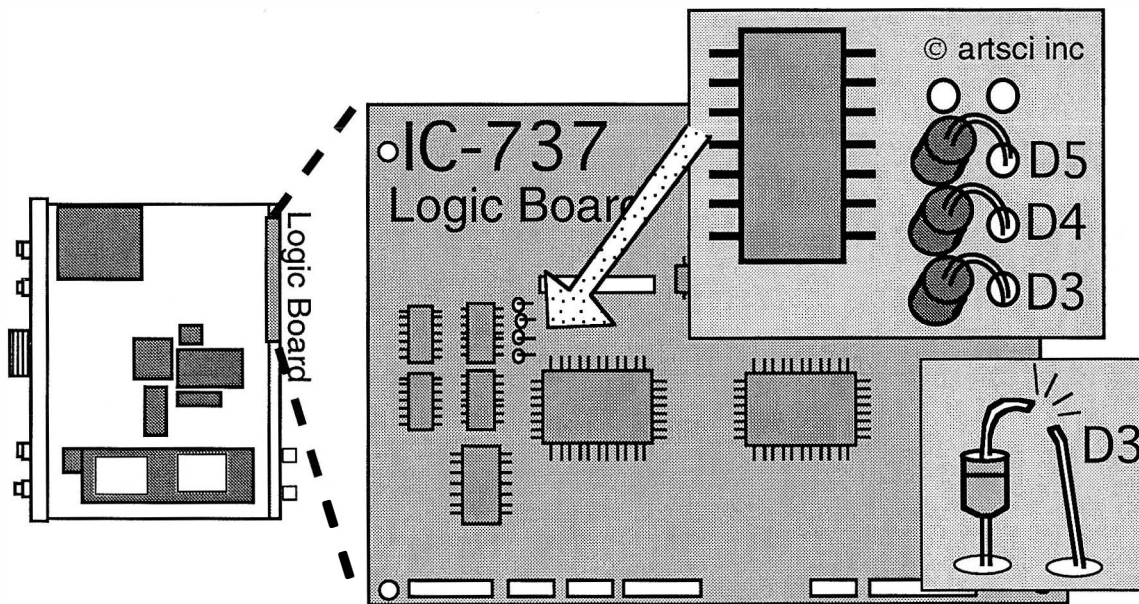


## ICOM IC-737

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws and open top cover.
3. Remove screws and open bottom cover.
4. Remove screws and remove PA unit.
5. Remove screws and fold out front display.
6. Locate Logic Unit on back of radio.
7. Locate diodes D3 on the LOGIC circuit board.
8. **Cut Diode D3.**
9. Reassemble the radio.

Note: Accessing the logic Board may require taking out many of the other components of the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

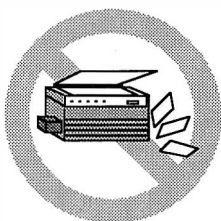
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-740

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate RF board.
4. **Cut (white resistor) jumper** located between D31 and 'C' wire.
5. **Reset the microprocessor.**
6. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

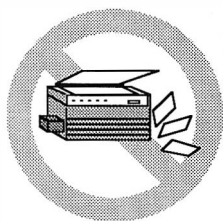
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-745

### EXPANDED RF

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate RF board on the side of the radio.
4. **Cut the light brown wire on J7 Pin 1.**
5. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-751

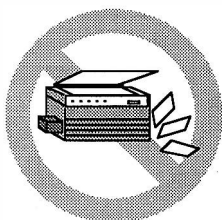
## EXPANDED RF

### OLDER VERSION

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate RF board on the side of the radio.
4. **Cut the black wire on J2 Pin 1.**
5. Reassemble the radio.

### NEW VERSION IC-751A

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate noise blanker board. (Near upper left hand of the front panel)
4. **Locate and cut resistor R34.** (far left end of the noise blanker board)
5. Reassemble the radio.



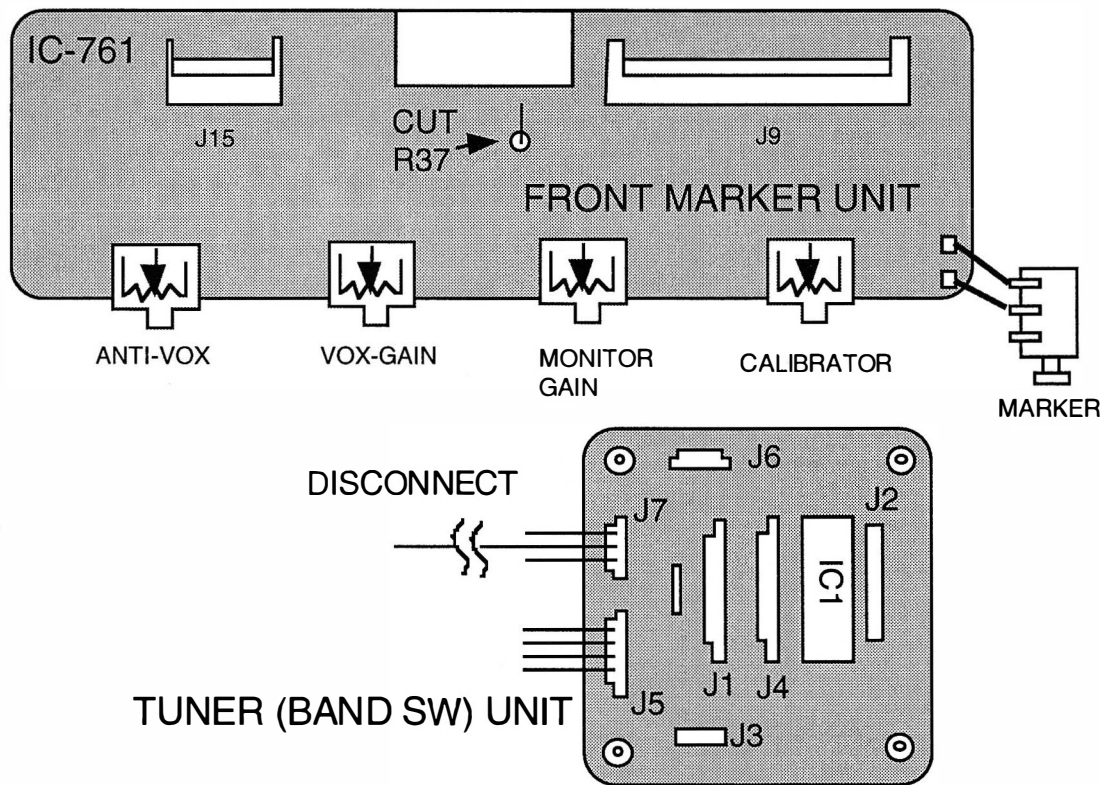
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-761

## EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case (top and bottom covers).
3. Locate front (Marker) Unit. (Behind the monitor gain controls)
4. Locate and **cut Resistor R37**.
5. Position radio normal side up and locate the Tuner band switch unit.  
(Located on top of the tuner unit and behind the keyer unit)
6. **Disconnect the mute line** (Middle wire) from the connector J407.  
(J407 is plugged into connector J7 on the Tuner band unit)
7. Reassemble the radio.
8. **Reset the microprocessor.** (Hold [M-CLEAR] and turn power on)



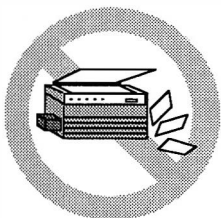
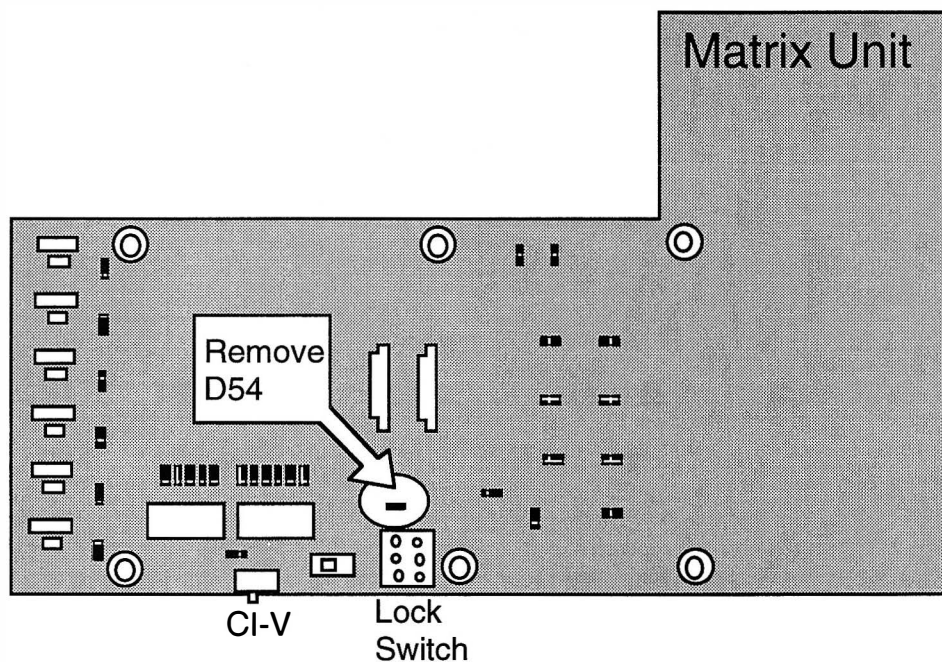
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-765

## EXPANDED RF

1. Remove power and antenna.
2. Remove screws and open bottom cover.
3. Locate and **remove diode D54**.  
Note: (It is located on the "L" shaped board mounted vertically).  
(Positioned just above the "LOCK" switch)
4. Reassemble the radio.
5. **Reset the microprocessor.** (Hold [M-CLEAR] and turn power on)



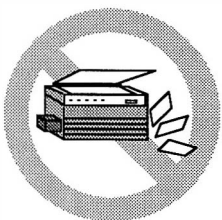
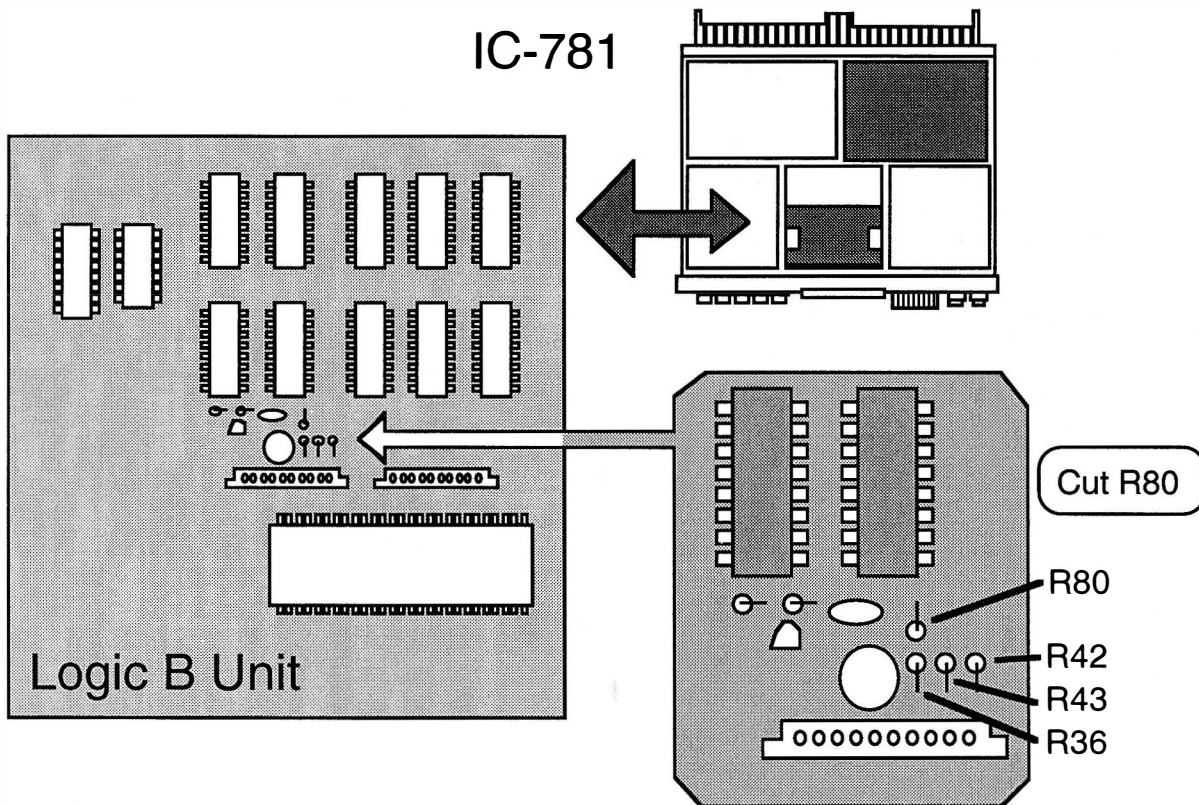
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-781

### EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate and **cut resistor R80** on Logic B unit.
4. Reset the microprocessor.
5. Reassemble the radio
6. **Reset the microprocessor.** (Hold [M-CLEAR] and turn power on)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

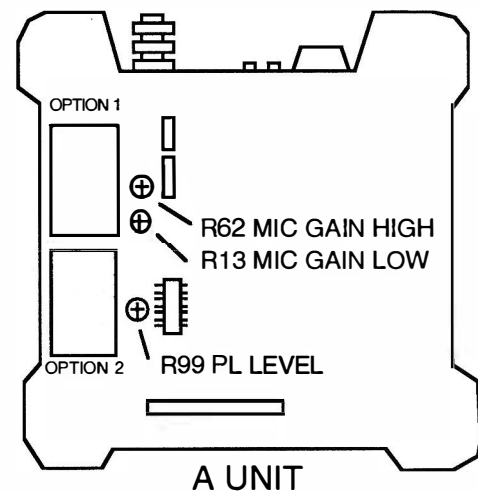
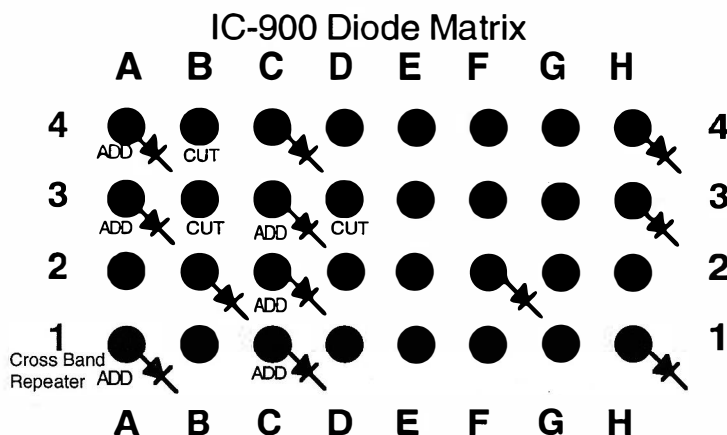
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# ICOM IC-900

## EXPANDED RF / CROSS BAND REPEATER

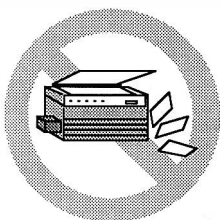
1. Open Control Head
2. Locate Diode Matrix on Display B board of Control Head.
3. **Add and remove Diodes according to drawing**
4. Reassemble control Head.
5. Open Interface A unit.
6. Change the switch position from "1" (factory) to "2" on interface A board (below the tone units).
7. Reassemble Interface A.
8. **Reset the microprocessor.** (Press and hold [MR] and turn power off and back on)



### CROSS BAND REPEATER PROCEDURES (Simplex Freqs only)

**TURN ON** - Turn LOCK switch ON.

**TURN OFF** - Turn LOCK switch OFF.



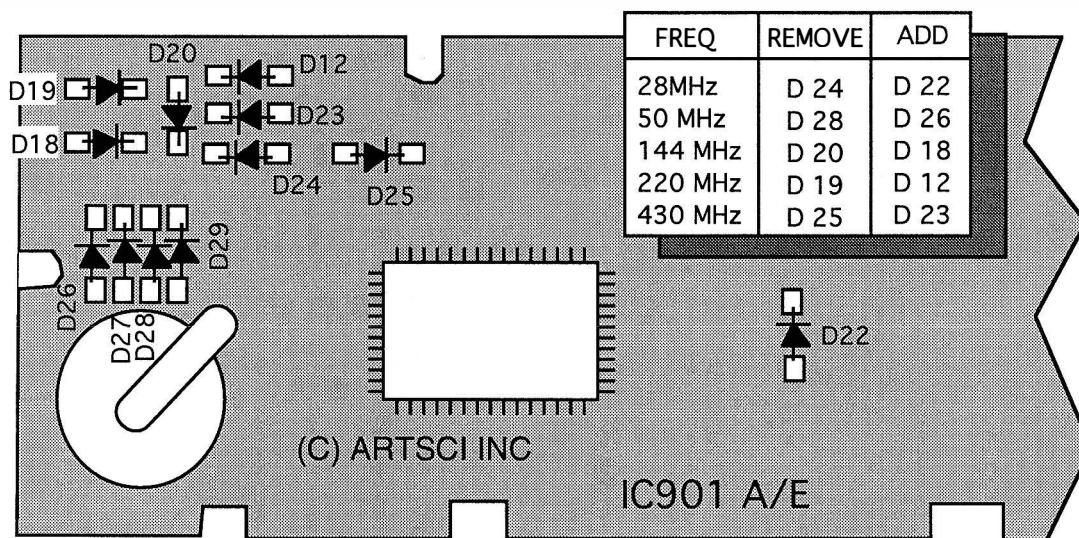
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-901A

## EXPANDED RF - CROSS BAND REPEATER

1. Remove control head Cable.
2. Remove screws and open "control head" case.
3. Located and **remove diodes D24, D28, D20, D19 and D25.**
4. Attach diodes **D22, D26, D18 D12, D23.**
5. **Remove Diode D27** (Cross band repeater mod).
6. Reassemble control head.
7. **Reset the microprocessor** (Turn radio on and press [CHECK] & [MW].



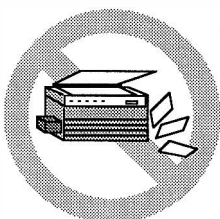
**Mic Gain Adjustment:** Adjust R70 in the Logic A Unit.

### TO ACTIVATE CROSS BAND REPEATER MODE:

1. Turn the power off.
2. Push and hold [CHECK] and [LOCK] and turn power on.

### TO DEACTIVATE CROSS BAND REPEATER MODE:

1. PRESS [LOCK] BUTTON.



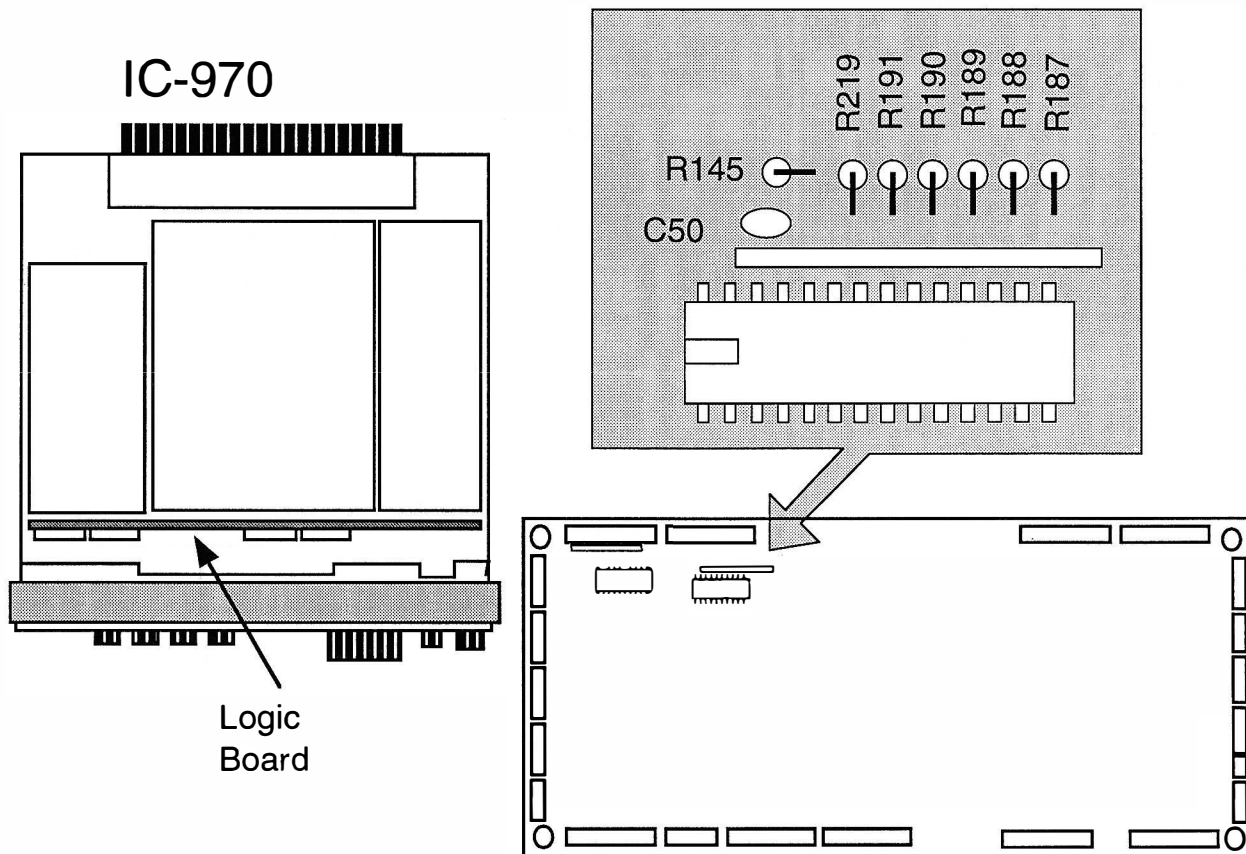
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-970

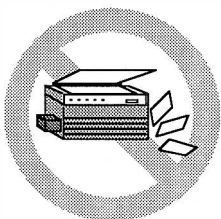
### EXPANDED RF

1. Remove power and antenna.
2. Remove top and bottom covers.
3. Locate and expose the logic board. (see drawing)
4. Locate and **cut resistor R187.**
5. Locate and **cut resistor R190.**
6. Locate and **cut resistor R219.**
7. Locate and **cut resistor R191.** (XBand Repeater Mod)
8. **Locate resistor position R 188 and add a 10K ohm resistor.**
9. Reassemble the radio.
10. **Reset the microprocessor.** (Push and hold [MW] and turn power on).



#### Cross Band Procedure:

- 1 ) Set the MAIN & SUB Frequencies.
- 2 ) Turn Radio off.
- 3 ) Press [LOCK] switch ON.
- 4 ) Press and hold [FUNCTION] & [M/S] switch and turn on.
- 5 ) TO CANCEL REPEATER FUNCTION - Turn the [LOCK] switch off.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

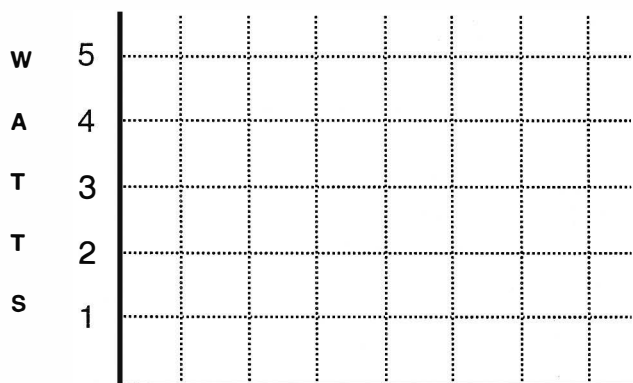
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

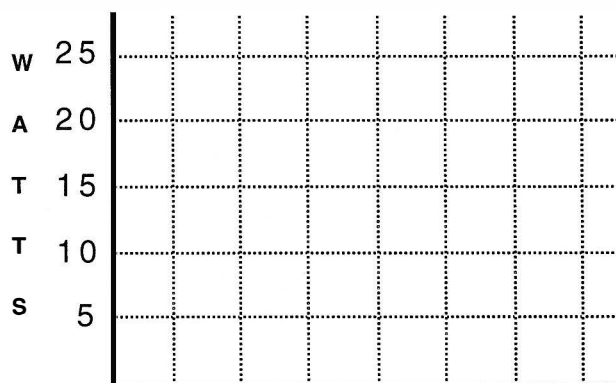
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

| Description                    | Before      | After       |
|--------------------------------|-------------|-------------|
| Power out (Low)                | _____ Watts | _____ Watts |
| Power out (High)               | _____ Watts | _____ Watts |
| Frequency Error (Simplex)      | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)       | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band) | _____ uv    | _____ uv    |
| Receive Sensitivity (____ MHz) | _____ uv    | _____ uv    |
| Receive Sensitivity (____ MHz) | _____ uv    | _____ uv    |
| PL Deviation                   | _____ Hz    | _____ Hz    |
| DTMF Deviation                 | _____ KHz   | _____ KHz   |
| Audio Deviation                | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr   | _____ MHz   | _____ MHz   |



Frequency

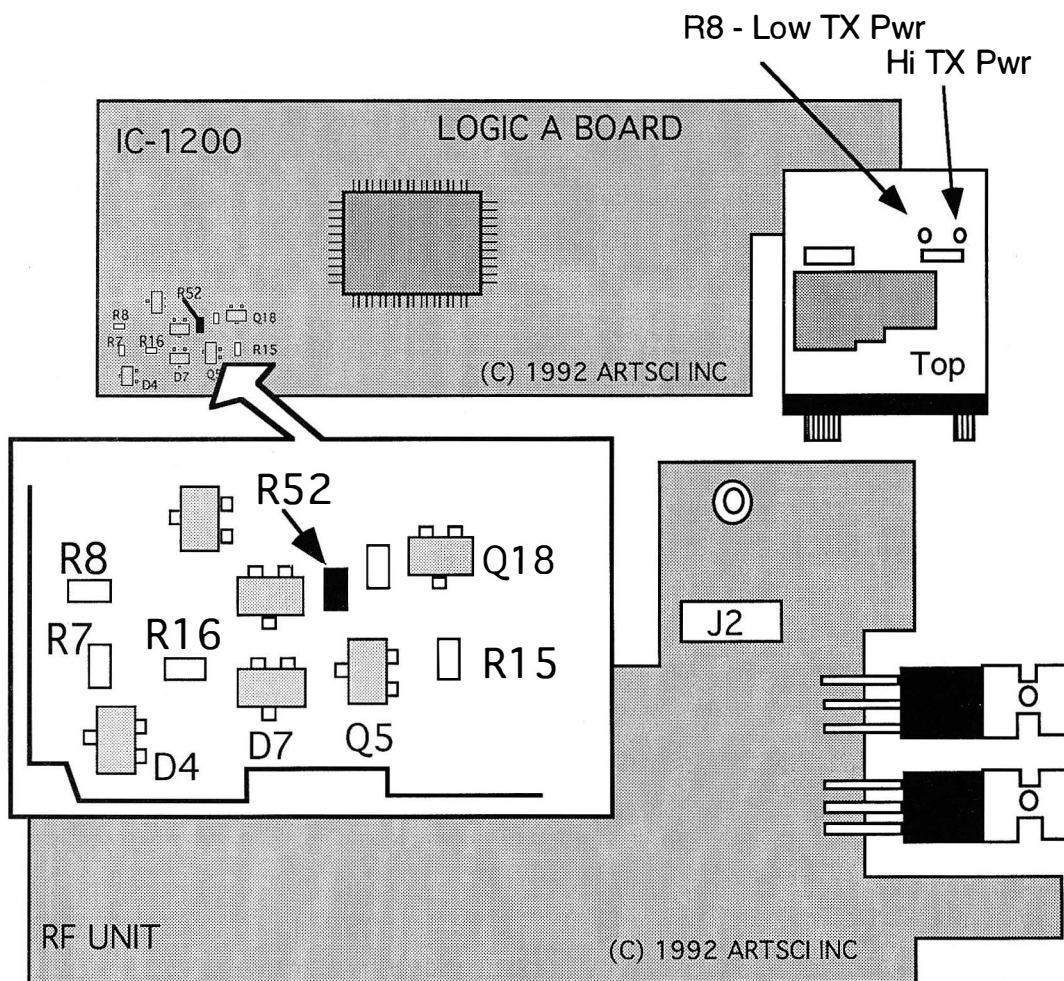


Frequency

# ICOM IC-1200

## EXPANDED RF 870-960 MHz

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate and **cut Resistor R52** on Logic A unit.
4. **Install a new antenna connector** to position J2 on RF board.  
Note: a different antenna is required for the 870-960 bands
5. Reassemble the radio.
6. Reset the microprocessor.  
(Hold down the tuning control and turn the power on)  
or  
(Insert a toothpick in hole in the corner of the bottom cover.)



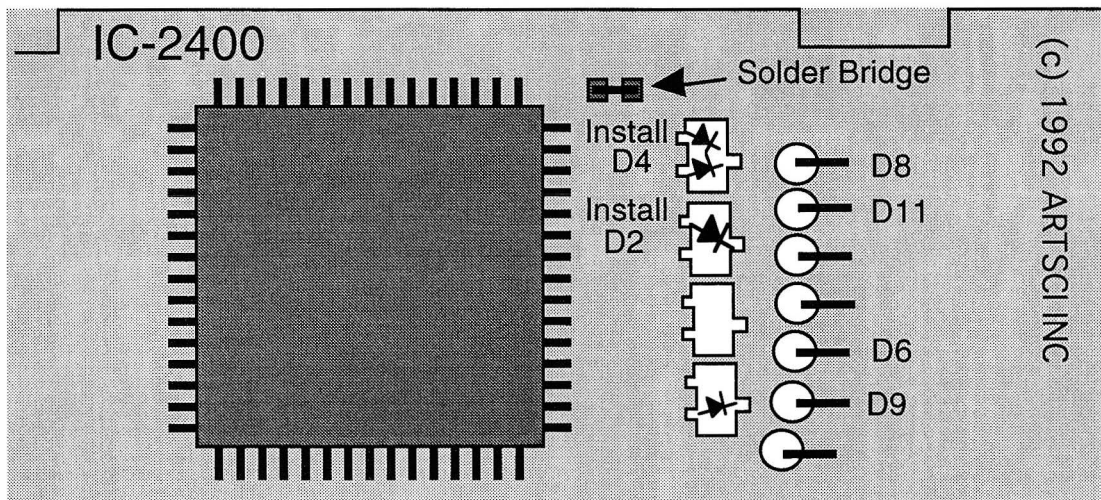
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-2400

### EXPANDED RF / CROSS BAND REPEATER

1. Remove battery and antenna.
2. Remove screws open case.
3. **Locate and cut diode D5.** (440 Mod)
4. **Locate and cut diode D6.**(440 Mod)
5. **Install chip diode .** (see drawing )(440 Mod)
6. **Locate and cut diode D11.** (2 Meter mod)
7. **Locate and cut diode D8.** (2 Meter mod)
8. **Install chip diode. D4** (1SS184 B3 )
9. **Install chip diode. D2** (1SS193 F3 )
10. **Solder jump pads.**
11. Locate and cut D9. (Repeater Mod)
12. Reassemble the radio.
13. **Reset the microprocessor.** (Press and hold [SUB VOL] & [MW] and turn power on)

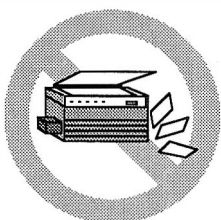


### CROSS BAND REPEATER PROCEDURES

**TURN ON** - Push and hold [SET], [MONI] & [MHZ] & Mic down Button and turn power on.

**TURN OFF** - Push and hold [SET] then press [MHZ]

**MORE ----**



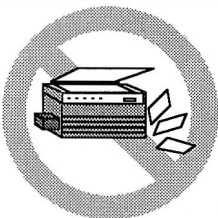
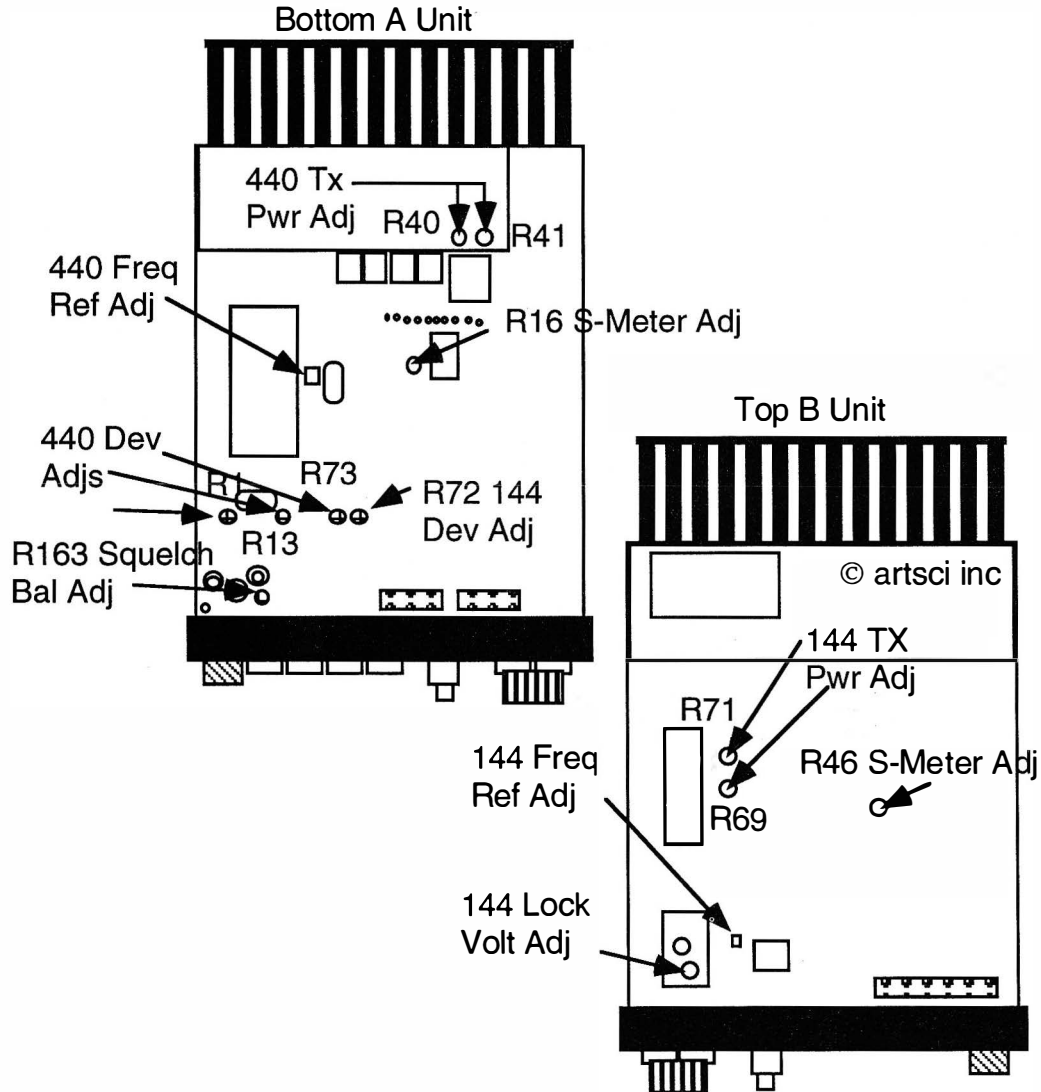
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-2400

## ALIGNMENT POINTS

### IC-2400A/E



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

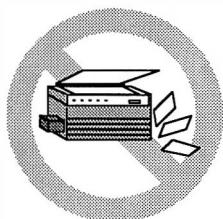
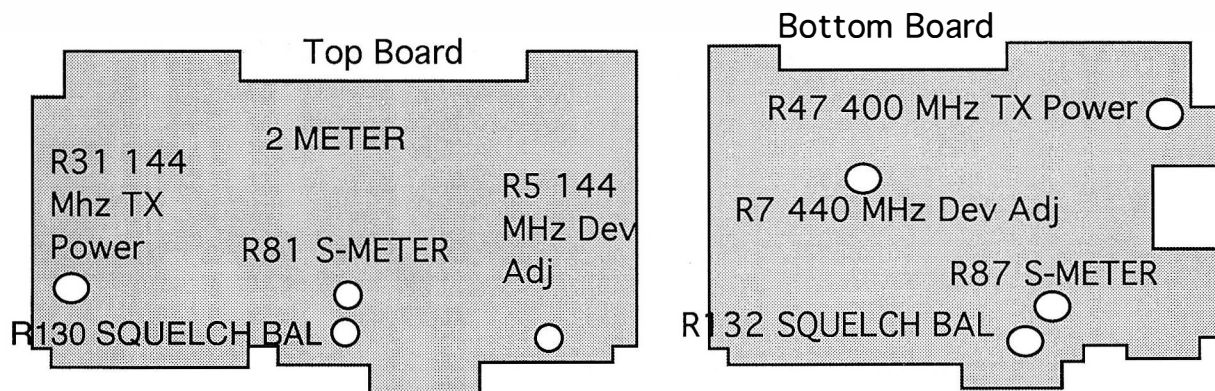
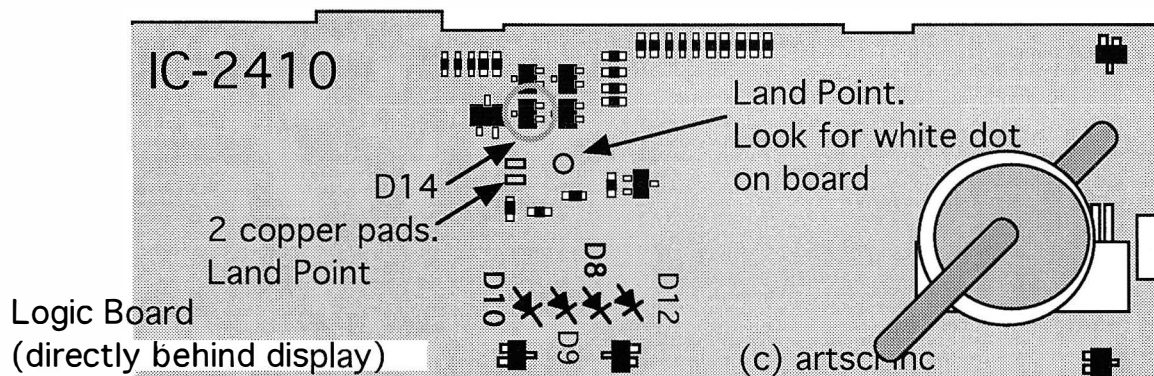
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# ICOM IC-2410

## EXPANDED RF

1. Remove power and antenna.
2. Remove screws open top and bottom case. (two on each top and 4 on each side)
3. Remove the 4 screws in the metal frame holding the front panel and pull the front face away from the radio.
4. Locate and **cut diode D9** on logic board. (VHF Rx mod 118 - 136 MHz)
5. Locate and **cut diode D10**. (UHF R Mod 440 - 479 MHz)
6. Locate and **cut diode D8**. (320-399 MHz & 830-950 Rx Mod)  
 Note: An antenna cable is required for 830-950 MHz range. Use Jack J2 on main board B to connect an antenna cable.
7. Locate and **solder jump 'LAND' point** (two copper pads) on logic board. (VHF Tx mod)
8. Locate diode D14 on logic board.
9. **Replace D14 with a 1SS181 diode**. (UHF Tx mod)
10. **Install a type "N" coax pigtail** (ICOM part OPC-166) to Connector J2 on 900 MHz IF strip. You will need a 5 3/4" gray coax jumper.  
 (Be sure to route the Pigtail through the antenna connectors in the rear panel).
14. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# ICOM IC-2410

## SPECIAL FUNCTIONS

### MINI REPEATER FUNCTION.

#### ACTIVATION

1. Set VHF & UHF Frequency. Offset and tone can be programmed in.
2. Press and Hold [BAND] & [SET] switch.  
The Memory number indicator will blink an "L" symbol.

NOTE: The microphone PTT will operational. Use the [UP] & [DOWN] keys to elect the transmitting band. A flashing decimal point will appear on the selected band.

#### CANCELLATION

1. Press and hold the [SET] button until the memory "number" display appears.

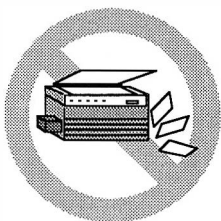
### VOICE ANSWER BACK FUNCTION (Optional UT-66 & UT-55 are required)

1. Switch on the SUB BAND remote mode. (see user manual)
2. Send remote control code "D" & "C" . (Control is on the sub band frequency)  
The operating frequency of the main band will be announced.

## SPECIAL COMMANDS

|                        |                                                 |
|------------------------|-------------------------------------------------|
| ENTER REMOTE DTMF MODE | Send "B" PASSWORD "#" Default is B000#          |
| EXIT DTMF REMOTE MODE  | Send "B" PASSWORD "*" Default is B000*          |
| XBAND REPEATER ON      | Press [BAND] & [SET] until flashing "L" appears |
| XBAND REPEATER OFF     | Press [SET] until memory # appears.             |
| REMOTE XBAND ON        | Send "D" "B" "*" on remote DTMF keypad.         |
| REMOTE XBAND OFF       | Send "B" "PASSWORD" "#" Default is B000#        |
| REMOTE VOICE READBACK  | Send "D" "C" on remote DTMF keypad.             |

XBAND function must be off to control all transceiver functions.



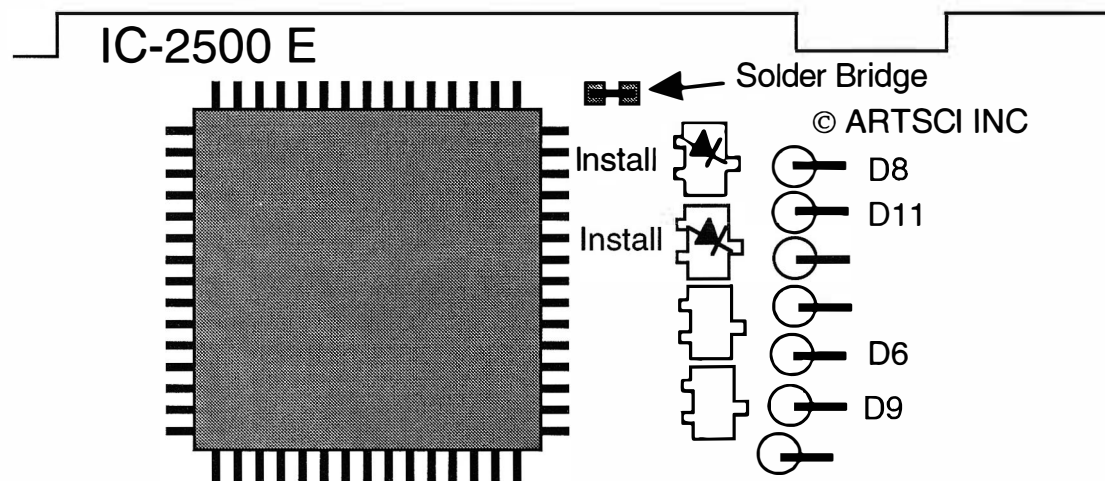
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-2500

### EXPANDED RF / CROSS BAND REPEATER

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and **cut diode D11.** (440 Mod)
4. Locate and **cut diode D 6.**(440 Mod)
5. **Install chip diode .** (see drawing )(440 Mod)
6. Locate and **cut diode D11**
7. Locate and **cut diode D8**
8. **Install chip diode.** (see drawing)
9. Solder jump pads.
10. Locate and **cut D 9** (Repeater mod)
11. Reassemble the radio.
12. **Reset the microprocessor.** (Press and hold [SUB VOL] & [MW] and turn power on)

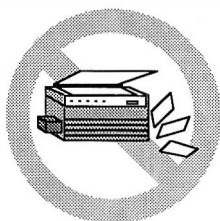


#### CROSS BAND REPEATER PROCEDURES

**TURN ON** - Push and hold [SET], [MONI] & [CALL] & Mic down Button and turn power on.

**TURN OFF** - Push and hold [SET] then press [MHZ]

**MORE ----**



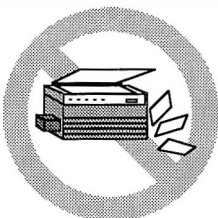
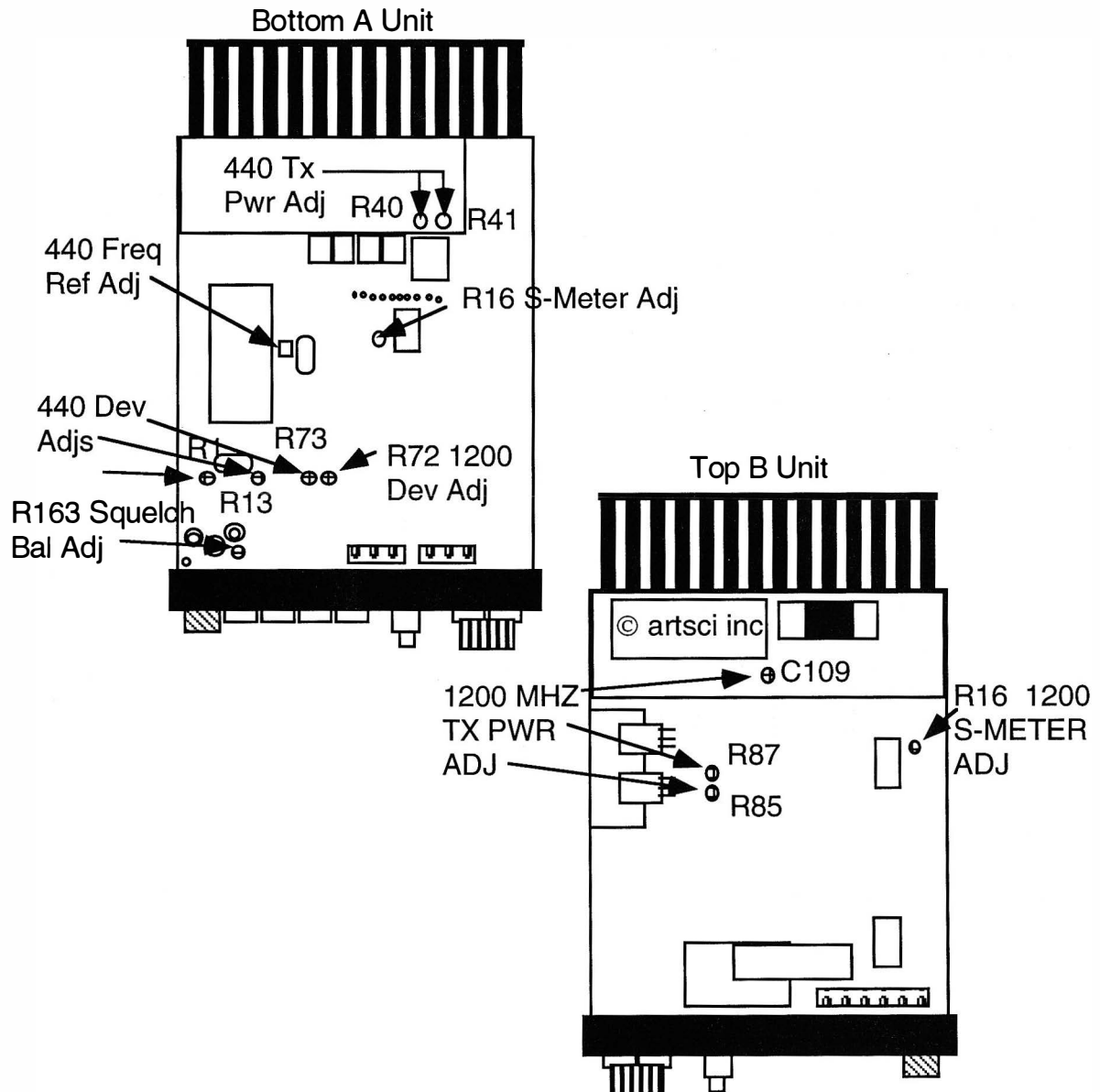
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-2500

## ALIGNMENT POINTS

### IC-2500A/E



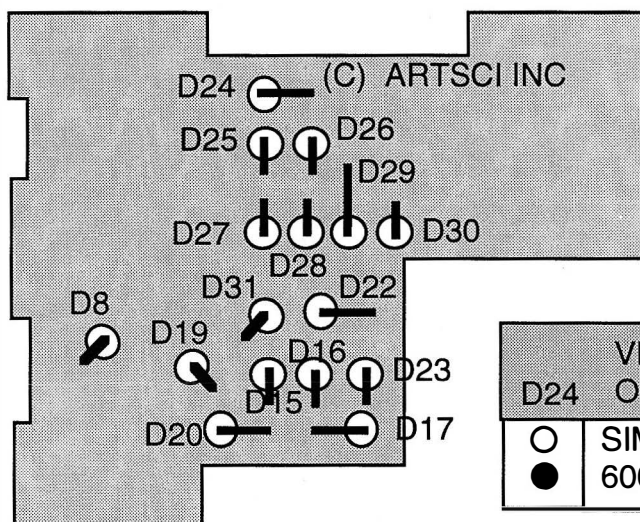
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-3200

## EXPANDED RF

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate Diode programming matrix (Control Head).
4. **Install or remove diodes** using tables below.
5. Reassemble the radio.
6. Reset the microprocessor.



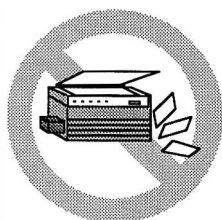
| D15 | D16 | D17 | RANGE     |
|-----|-----|-----|-----------|
| ○   | ○   | ○   | 144 - 154 |
| ●   | ○   | ○   | 144 - 146 |
| ○   | ●   | ○   | 140 - 148 |
| ●   | ●   | ○   | 140 - 150 |
| ○   | ○   | ●   | 144 - 156 |
| ●   | ○   | ●   | 140 - 154 |
| ○   | ●   | ●   | 140 - 150 |

| D24 | VHF<br>OFFSET |
|-----|---------------|
| ○   | SIMPLEX       |
| ●   | 600 KHZ       |

| D19 | D20 | D18 | RANGE     |
|-----|-----|-----|-----------|
| ○   | ○   | ○   | 430 - 440 |
| ●   | ○   | ○   | 432 - 437 |
| ○   | ●   | ○   | 430 - 440 |
| ●   | ●   | ○   | 430 - 440 |
| ○   | ○   | ●   | 440 - 450 |

| D27 | D28 | UHF<br>OFFSET |
|-----|-----|---------------|
| ○   | ○   | SIMPLEX       |
| ●   | ○   | 0 MHZ         |
| ○   | ●   | 5 MHZ         |
| ●   | ●   | 7.6 MHZ       |

**MORE ---**

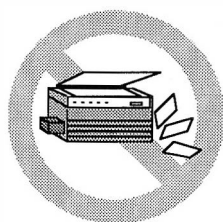
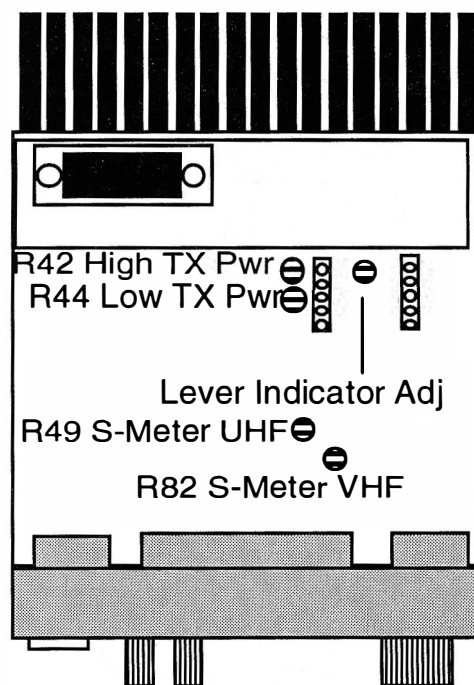
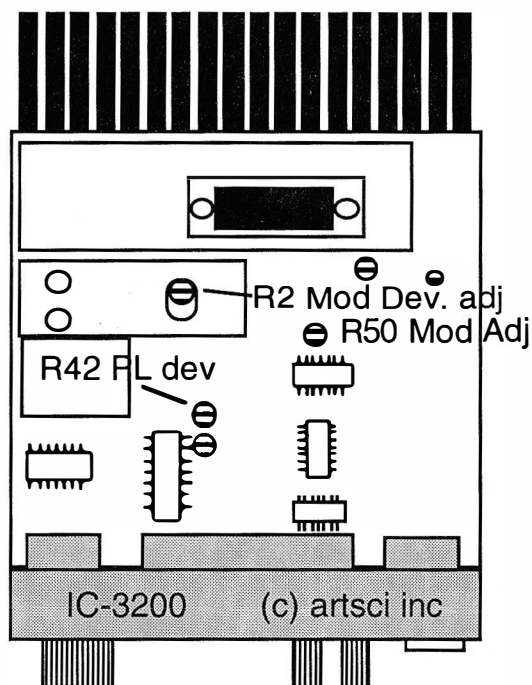


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-3200

## Alignment Controls



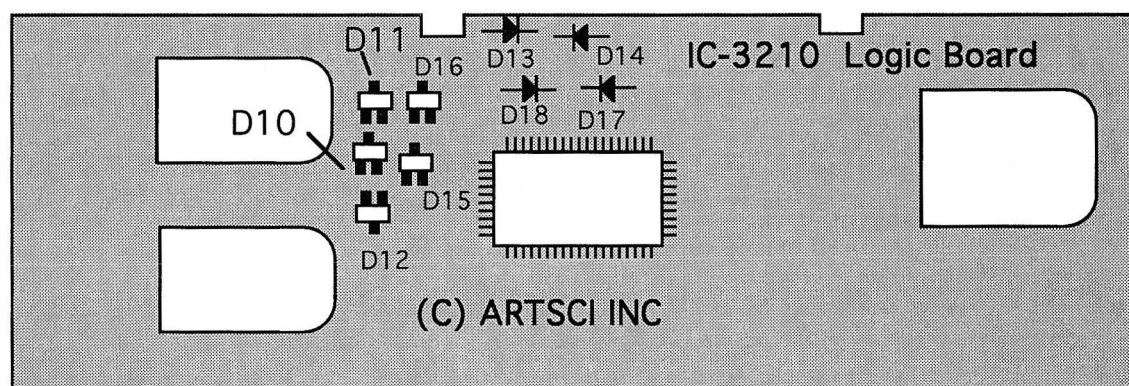
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-3210

### EXPANDED RF / CROSS BAND REPEATER

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and **cut diode D17**. (Already removed in USA version) (144 mod)
4. **Replace chip diode D10** in position A. (New: 1SS184 B3) (144 mod)
5. Locate and **cut diode D18**. (440 mod)
6. **Replace chip diode D11** in position B (old: 1SS196 New: 1SS184 (B3))(440 mod)
7. Locate and **cut diode D14**. (Repeater mod)
8. Reassemble the radio
9. **Reset the microprocessor**. (Push and hold [SQUELCH/Monitor] & [LOCK] and turn power on)

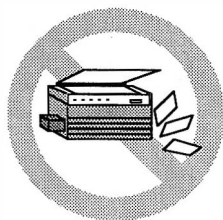


### CROSS BAND REPEATER PROCEDURES

**TURN ON** - Set radio to "SPT mode". Push and hold "Band switch & "Lock switch" ("SPT" and "L" will flash)

**TURN OFF** - Press [LOCK] switch.

**MORE ---**

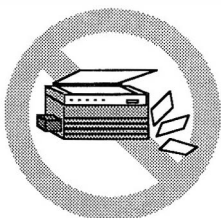
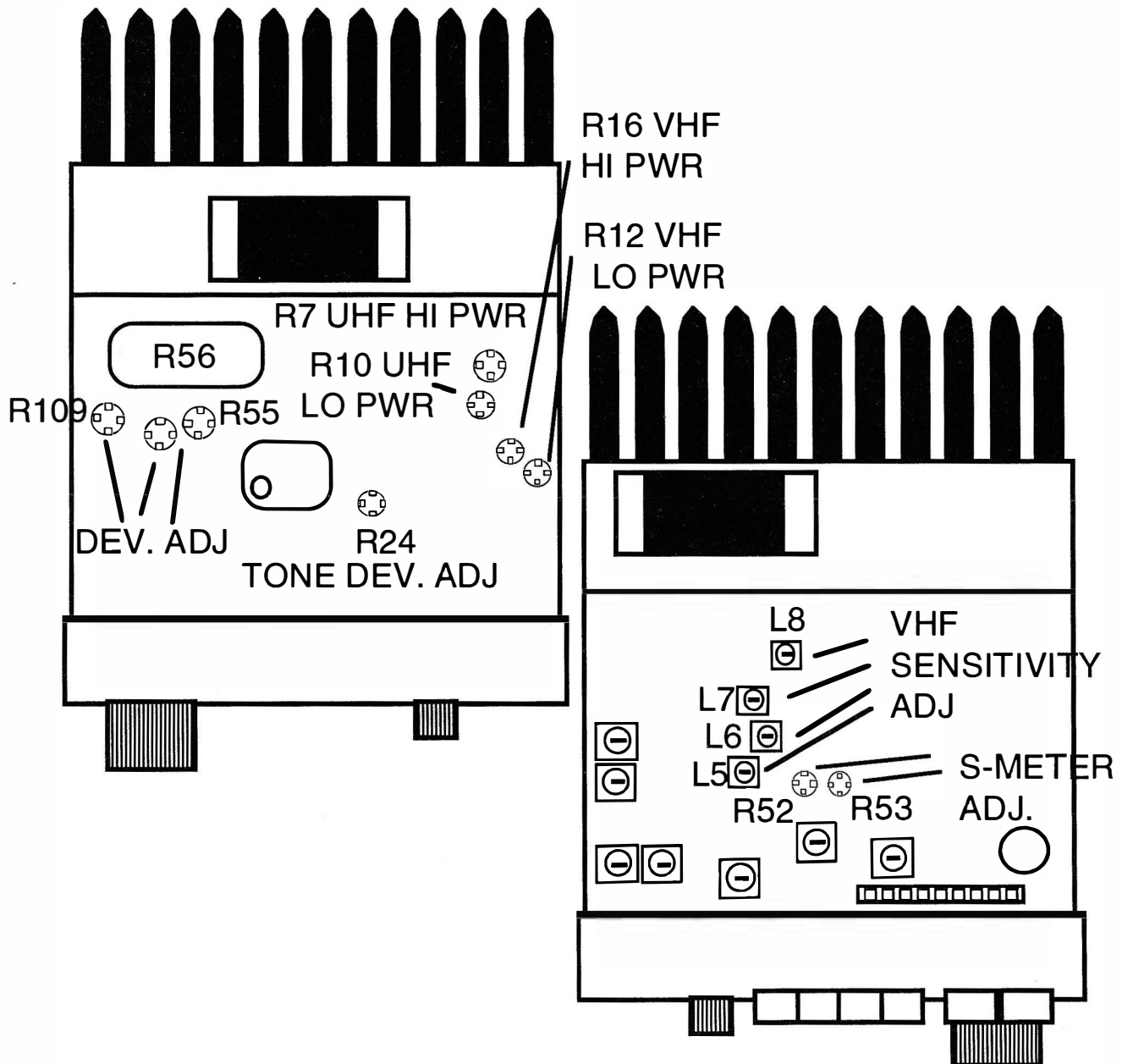


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-3210

## ALIGNMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

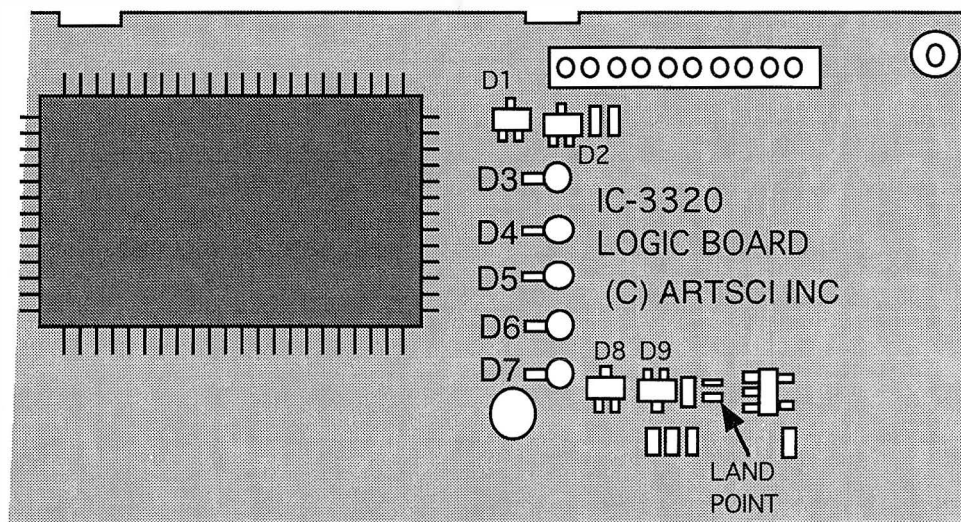
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## ICOM IC-3220

### EXPANDED RF & Air Craft AM

1. Remove power and antenna.
2. Remove screws open case.
3. Locate and **Cut Diode D4** on the LOGIC board. (VHF 118 -135 MHz)
4. Locate and **Cut Diode D5** on the LOGIC board. (UHF)
5. **Install a jumper at "land" point.** (VHF) Located right of D9.
6. **Install a diode (1SS181) at Location D9** on the LOGIC board.
7. Reassemble the radio
8. **Reset the microprocessor.** (Press and hold [SET] & [MW] and turn radio on)



|                                    |                                    |
|------------------------------------|------------------------------------|
| FREQ 118.000 - 135.995 MHz (AM) RX | 136.000 - 174.000 MHz (FM) RX      |
| 136.000 - 174.000 MHz (FM) TX      | 440.000 - 479.000 MHz (FM) RX & TX |

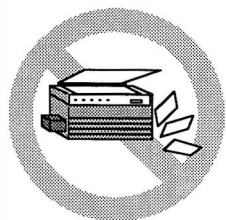
### CROSS BAND REPEATER PROCEDURES

**TURN ON** - Set VHF & UHF Frequencies in DUAL WATCH mode.  
Press and hold [BAND] and press [SET]. Memory channel will show a flashing "L"

**TURN OFF** - Press [SET] key. Turning off the radio will not disable repeater mode.

Note: The Mic PTT will still operate the radio in repeater mode!!!

**MORE ---**

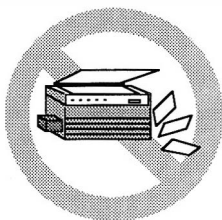
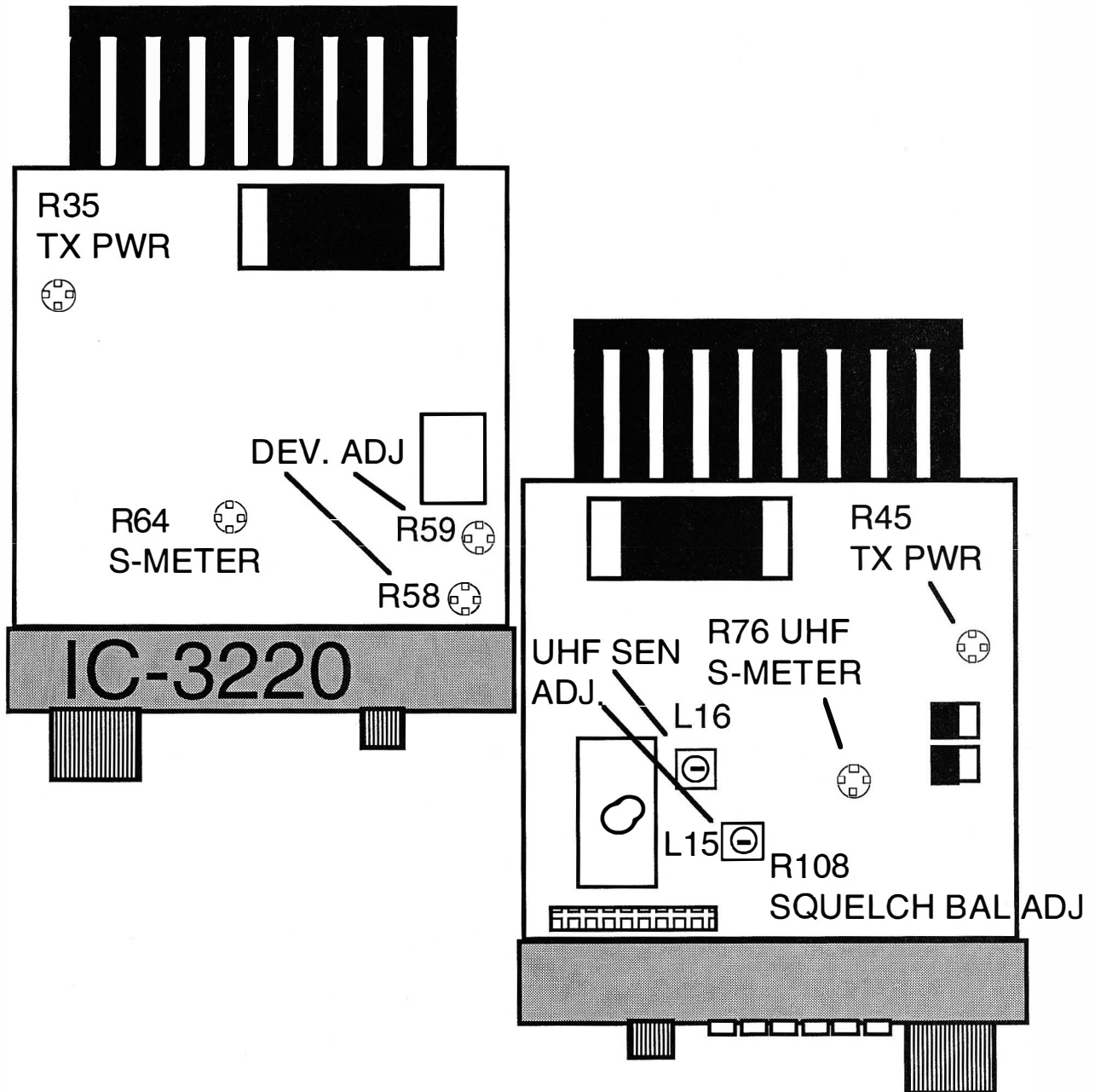


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-3220

## ALIGNMENT CONTROLS



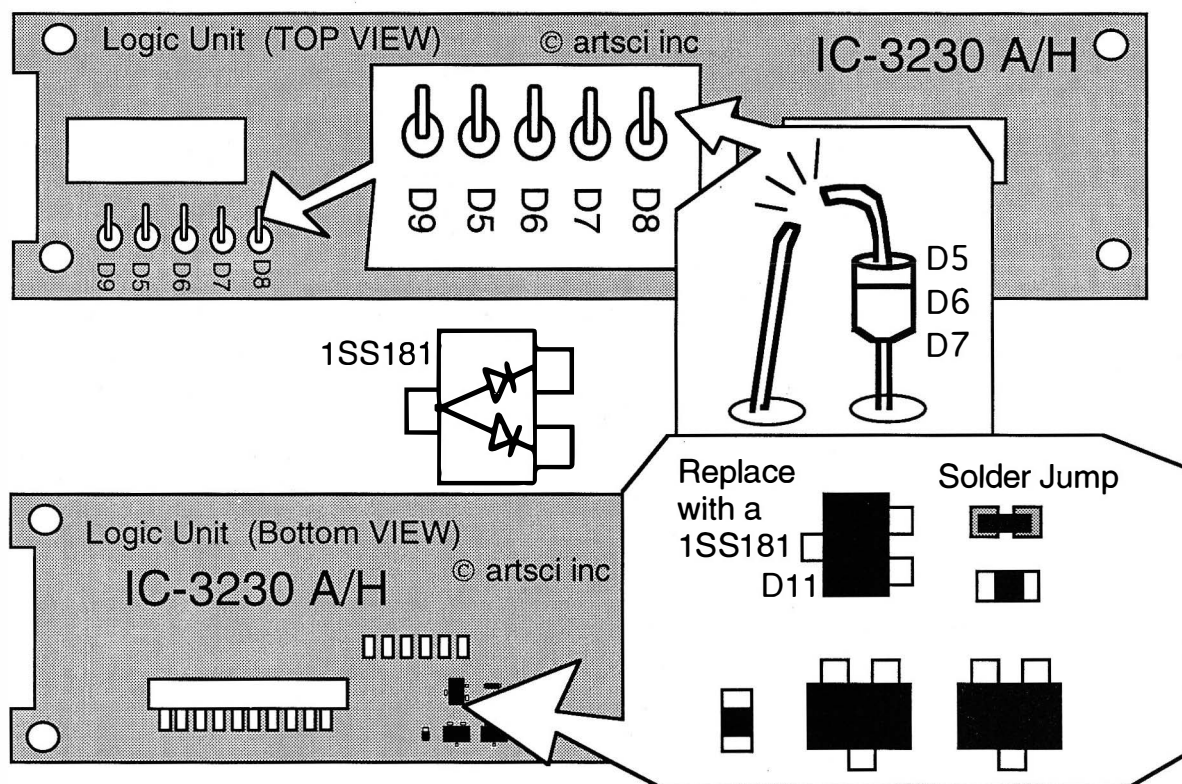
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

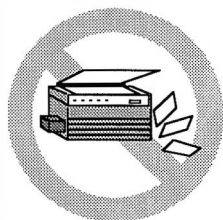
# ICOM IC-3230

## EXPANDED RF

1. Remove power and antenna.
2. Remove 12 case screws
3. Remove 4 front cover screws
4. Remove 4 screws holding front frame to main frame.
5. Pull front frame out enough to access front frame.
6. Locate and clip **D5** =174-300 MHz RX, **D6** = 118-136 MHz RX, **D7**=450-479 MHz RX
7. Unclip the two white ribbon cables attaching the logic board to the main frame.
8. **Solder jump foil pad as shown.** 118 - 174 TX mod.
9. **Replace D11 with a 1SS181 [A3].** 450-479 TX mod.
10. Reassemble the radio.



For 800MHz reception add an antenna cable to jack J1. Run the cable out the back of the radio via the extra antenna coax plug.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM H16

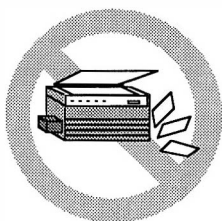
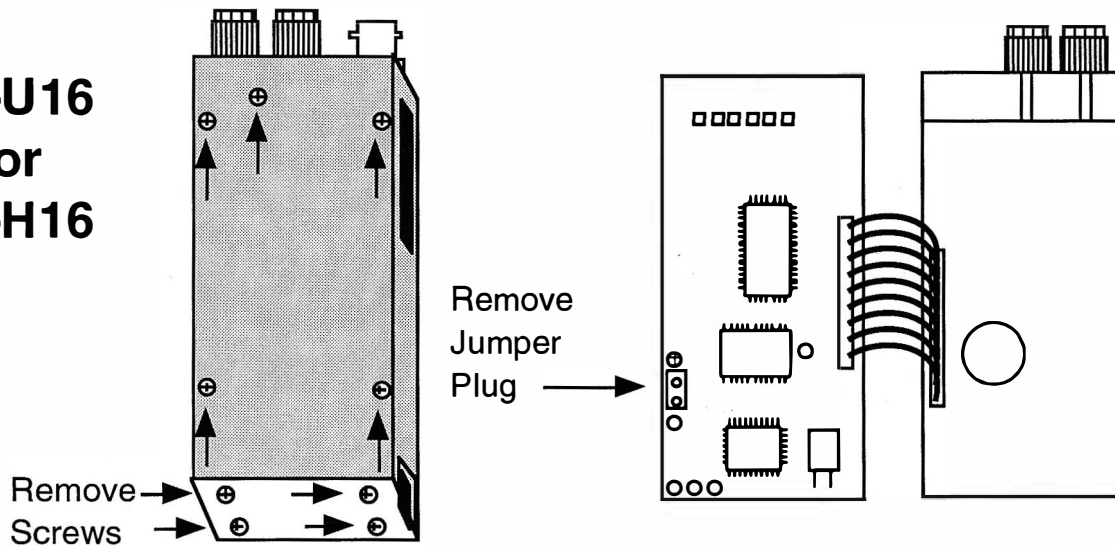
## USER PROGRAMMABLE MODIFICATION

1. Remove battery and antenna.
2. Remove 9 screws and open Radio.
3. Locate and remove Jumper plug.
4. Reassemble the radio.

Programming commands:

- 1) Hold down [FUNCTION] key and press [1] [5] [9] [3] [5] [7].
- 2) Hold down [FUNCTION] and press :
  - [1] - Transmit PL tone. (2 digits)
  - [2] - Receive PL Tone. (2 digits)
  - [4] - Offset in MHz. (i.e.. +05000 =+5 MHz)
  - [5] - Frequency.
  - [7] - Rename Ch#
  - [8] - Time out Timer
  - [9] - TX Inhibit
- 3) Enter #'s and press [Ent].
- 4) To Exit Programming mode Hold [FUNCTION] and press [CLR].

**IC-U16  
or  
IC-H16**



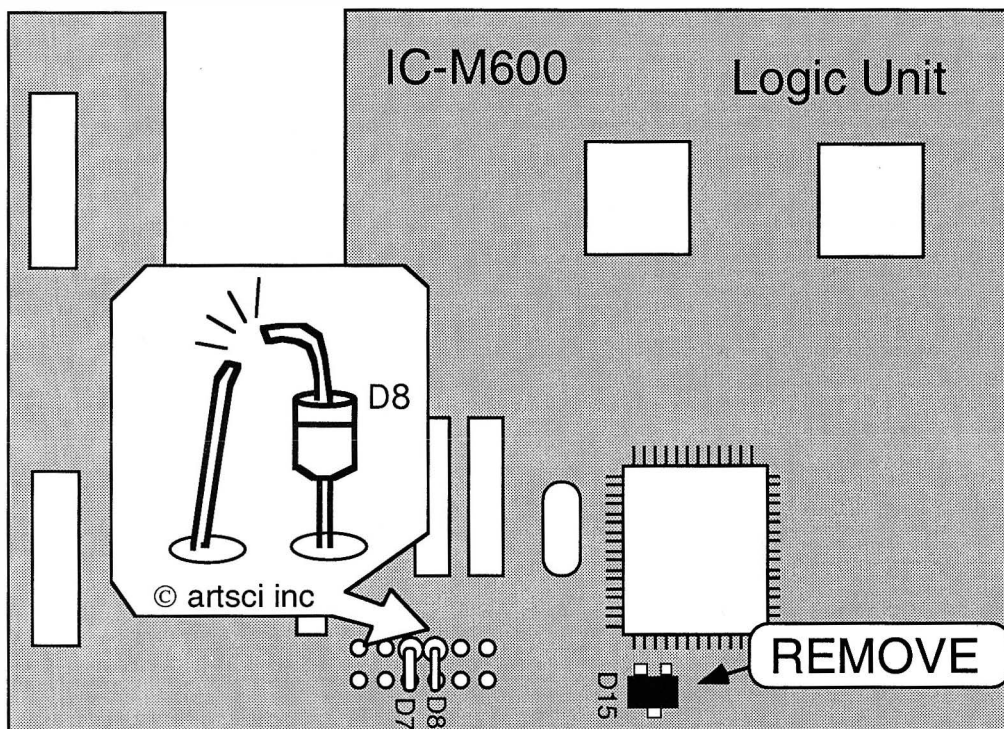
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-M600

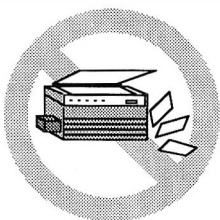
### EXPANDED RF / LSB ACCESS

1. Remove power and antenna.
2. Open radio and find LOGIC unit.
3. Locate and **cut Diode D8**.
4. Locate and **remove D15**.
5. Reassemble the radio.



### LSB Mode

1. Press and hold [MODE] button and turn power on.
2. Select LSB mode with Mode button.
3. Press [RX] button
4. Press [TX] button
5. Turn the radio off



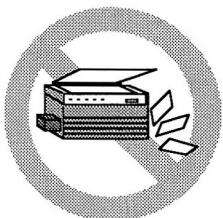
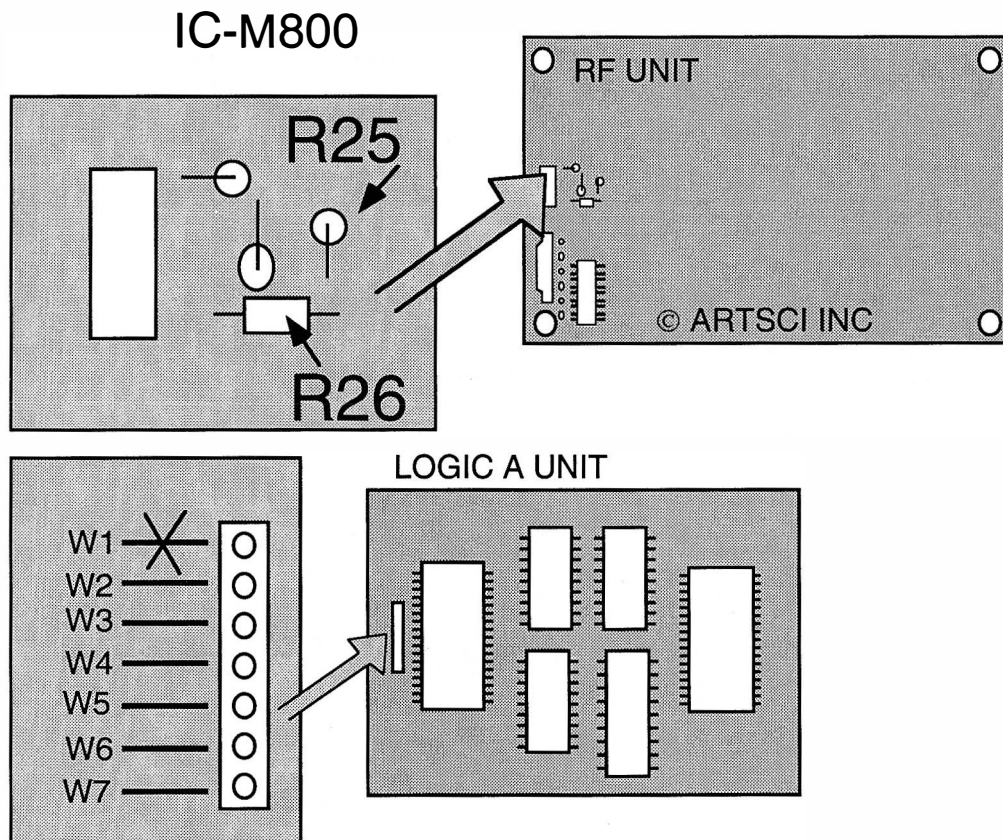
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-M800

## EXPANDED RF

1. Remove power and antenna.
2. Open radio and find RF unit.
3. Locate and **cut Resistor R25 & R26**.
4. Locate Logic A unit.
5. Locate and **cut jumper W1**.
6. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

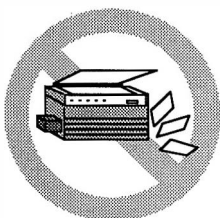
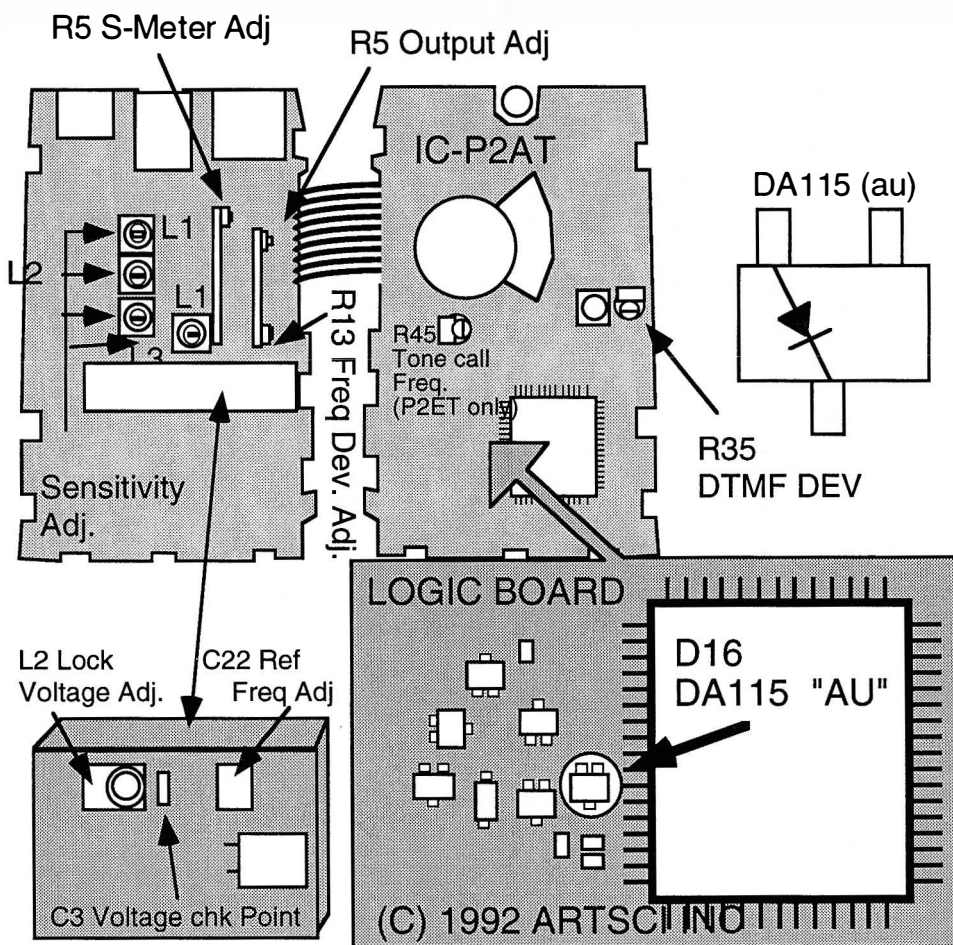
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# ICOM IC-P2AT

## EXPANDED RF /ALIGNMENT CONTROLS

1. Remove battery and antenna.
2. Remove screws and open radio.
3. **Install Diode D16** (symbol AU, DA115) (see drawing).
4. Reassemble radio.
5. **Reset Microprocessor.** (Press and hold [FUNC] and [V/M] and turn on. Wait for display to normalize before releasing buttons)



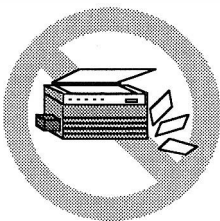
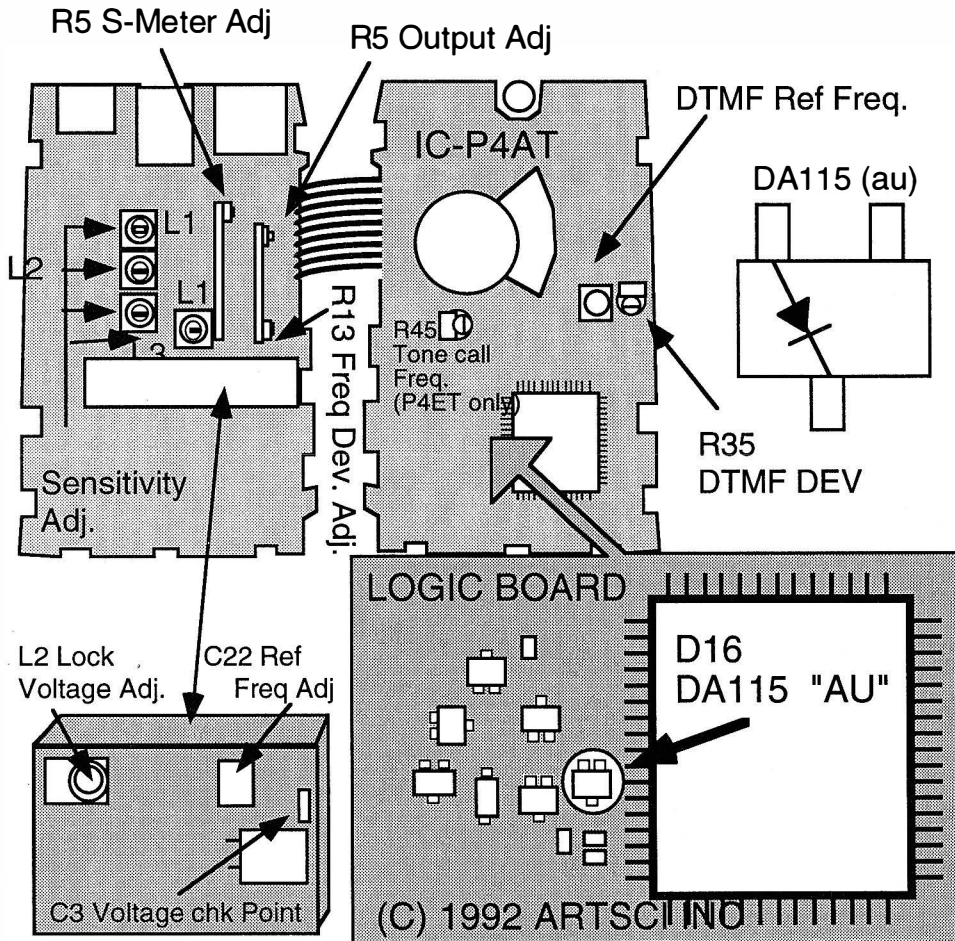
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-P4AT

## EXPANDED RF

1. Remove battery and antenna.
2. Remove screws and open radio.
3. **Install Diode D16** (DA115 symbol AU) (see drawing).
4. Reassemble radio.
5. **Reset Microprocessor.** (Press and hold [FUNC] and [V/M] and turn on. Wait for display to normalize before releasing buttons)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## ICOM IC-R71

### EXPANDED RF

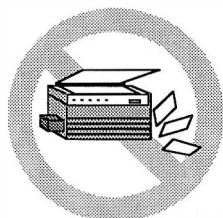
Receive down to 5 kHz.

1. Enter the memory channel mode and select any memory channel.
2. Push the [FUNCTION] key and [CLEAR MEMORY] button.
3. Tune (rock) memory channel knob and the main dial at the same time.  
Keep rocking both until frequency display goes to 00.00.
4. Tune UP only! If you tune down the display will return to 96 kHz.

### Display Failure

Replace the following components:

C14 = 33 $\mu$  16v.  
C20 = 10 $\mu$  16v.  
C15 = 4.7 $\mu$  25v.  
C17 = 3.3 $\mu$  50v.  
C18 = 0.1 $\mu$  50v.  
C21 = 10 $\mu$  16v.  
C19 = 10 $\mu$  16v.  
C22 = 10 $\mu$  16v.  
C16 = 3.3 $\mu$  50V.



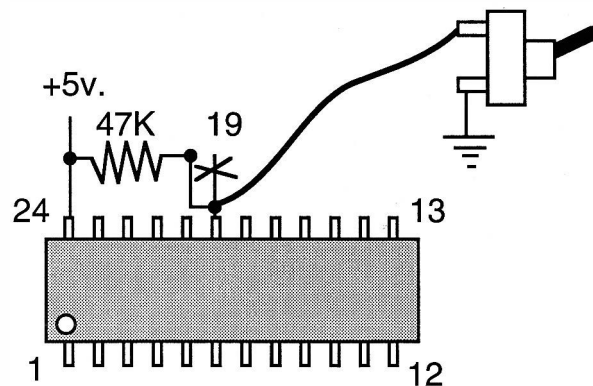
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-R7000

## 100 MORE MEMORY CHANNELS

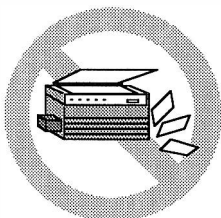
1. Remove power and antenna.
2. Remove screws and open case.
3. Locate the logic board.
4. Locate pin 19 on IC-8.
5. **Cut foil trace** to ground.
6. **Attach a 47K Ohm resistor and a switch** as shown.
7. Reassemble the radio.



### Operation:

When the switch is closed, memory channels 0-99 will operate.  
 When the switch is open, memory channel 100-200 will operate.

Scanning will operate in only one memory bank at a time.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

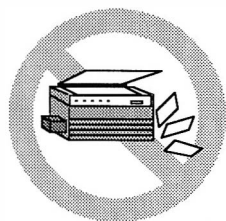
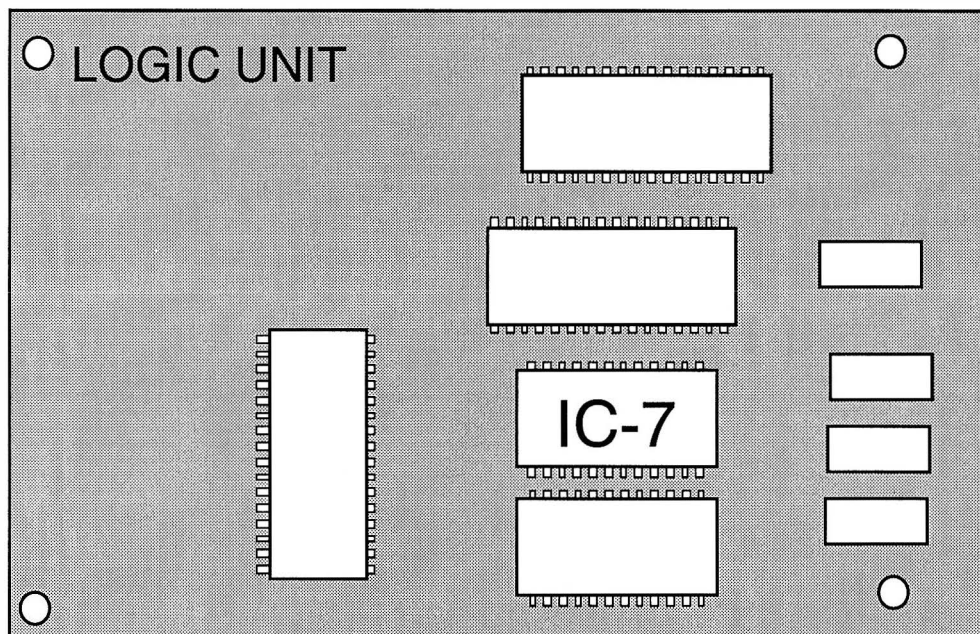
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-RP1220, RP1520, RP4020, RP4520

### CTCSS DEFAULT MODIFICATION

1. Remove power and antennas
2. Remove bottom cover (12 screws)
3. Locate and **remove IC-7** (it is in a socket)
4. **Install a new IC-7** (Part # SC1222 ICOM Part # 900-08922)
5. Reset cover and screws.

Note: No reset is required.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM Delta1

### EXPANDED RF

118 - 136 MHz AM mode (RX only)  
136 - 174 MHz FM mode (TX & RX)  
350 - 470 MHz FM mode (TX & RX)  
800 - 950 MHz FM mode (RX only)  
1240 - 1300 MHz FM mode (TX & RX)

1. Remove battery and antenna.
2. Remove screws and open the radio.
3. Locate and **remove Diode D14**
4. **Replace Diode D13** with a MA132HK (ICOM part # 1790000830)
5. **Replace Diode D15** with a MA132Wk (ICOM part # 1790000850)
6. Reassemble the radio.
7. Reset the microprocessor if required. (see User Manual for RESET instructions)

### OPTIONAL Receive Expansion - Keyboard only

1. Press [B] & [#] and turn radio on.

## Cross Band Repeater Operation

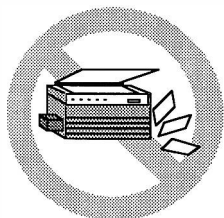
1. Set desired frequencies in both bands
2. Set radio to operate in two bands only.

TOACTIVATE - Press [FUNC] & [MONI] & [ENT] at the same time.

TODEACTIVATE - Press [FUNC] & [MONI] & [ENT] at the same time.

## Squelch Function -

Push the [S] key and turn the Frequency set Knob for each band  
Note: The [S] key is near the PTT and [Function] switch (left side)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

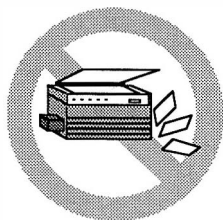
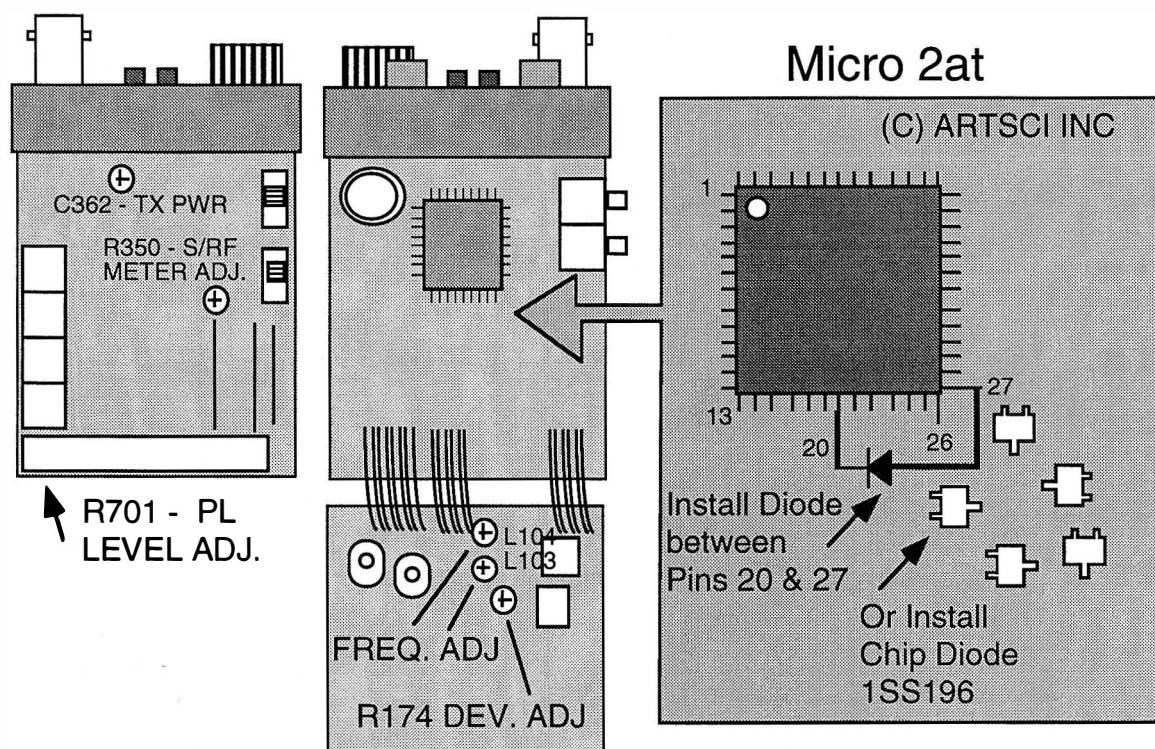
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM $\mu$ 2AT

## EXPANDED RF

1. Remove battery and antenna.
2. Remove 4 screws and open Radio.
3. Separate shield & top circuit board from bottom board.
4. Locate Microprocessor board.
5. **Tack solder a 1N914 Diode across Pin 20 & 27**  
or attach a chip Diode 1SS196 as shown.
6. Reassemble the radio.
7. **Reset the microprocessor.** (Push and hold lamp and turn on power.)

Note: This diode is placed across pin 20 & 27 of CPU. Drawing is not to Scale.  
MICROPROCESSOR is under the Tone Pad (under shield)



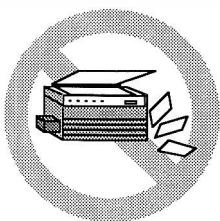
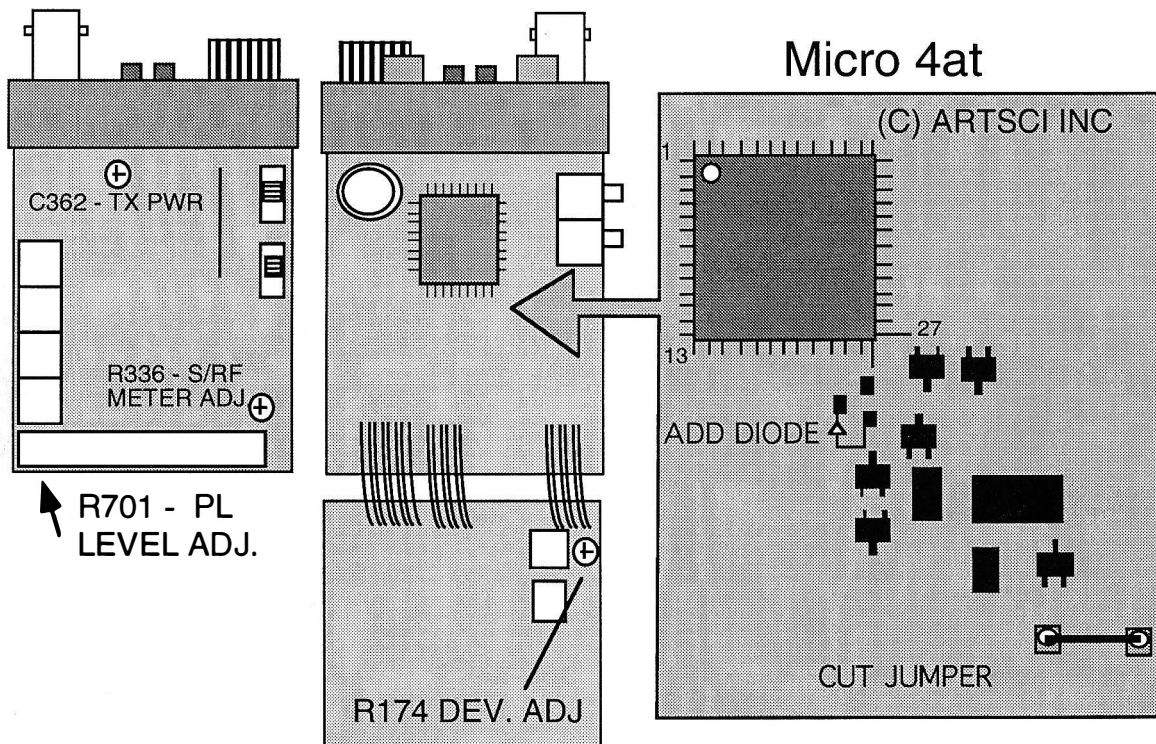
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM $\mu$ 4AT

## EXPANDED RF

1. Remove battery and antenna.
2. Remove 4 screws and open Radio
4. **Tack solder a 1N914 Diode across chip diode position.**  
or attach a chip Diode 1SS196.
5. Reassemble the radio.
6. **Reset the microprocessor.** (Push and hold lamp and turn on power.)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

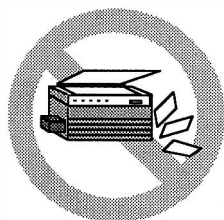
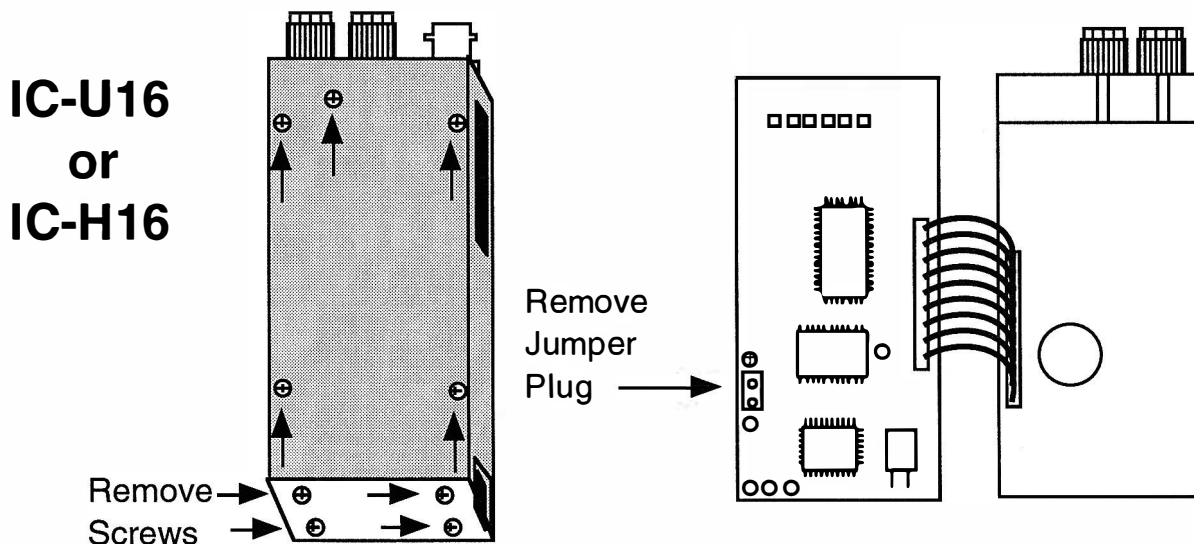
## ICOM U16

### USER PROGRAMMABLE MODIFICATION

1. Remove battery and antenna.
2. Remove 9 screws and open the radio.
3. Locate and remove Jumper plug.
4. Reassemble the radio.

Programming commands:

- 1) Hold down [FUNCTION] key and press [1] [5] [9] [3] [5] [7].
- 2) Hold down [FUNCTION] and press :
  - [1] - Transmit PL tone. (2 digits)
  - [2] - Receive PL Tone. (2 digits)
  - [4] - Offset in MHz. (i.e.. +05000 =+5 MHz)
  - [5] - Frequency.
  - [7] - Rename Ch#
  - [8] - Time out Timer
  - [9] - TX Inhibit
- 3) Enter #'s and press [ENT].
- 4) To Exit Programming mode Hold [FUNCTION] and press [CLR].



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

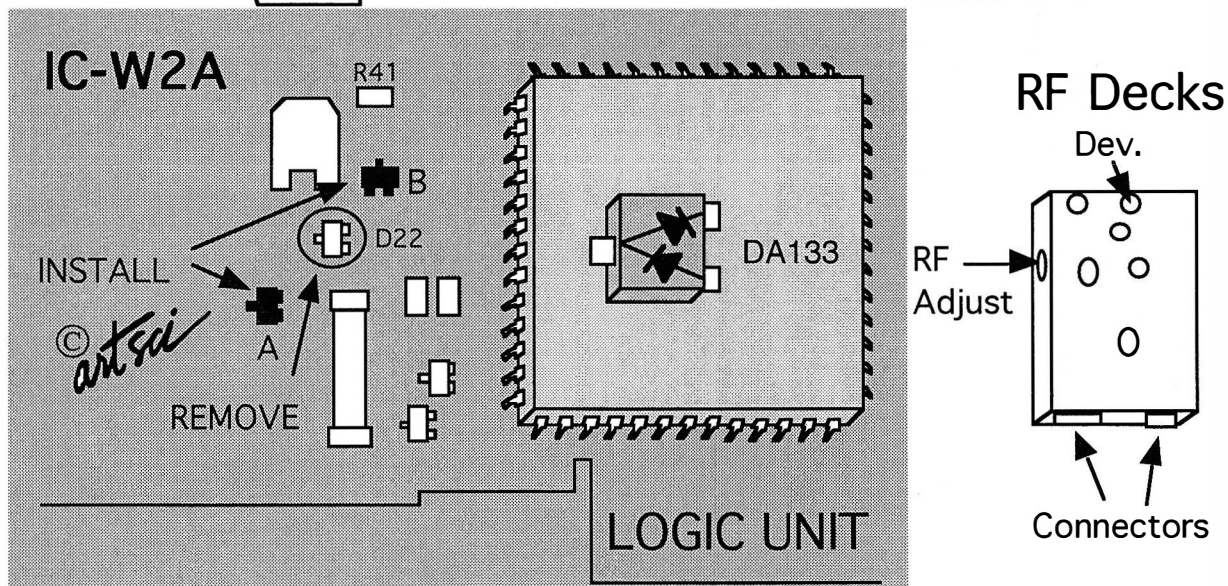
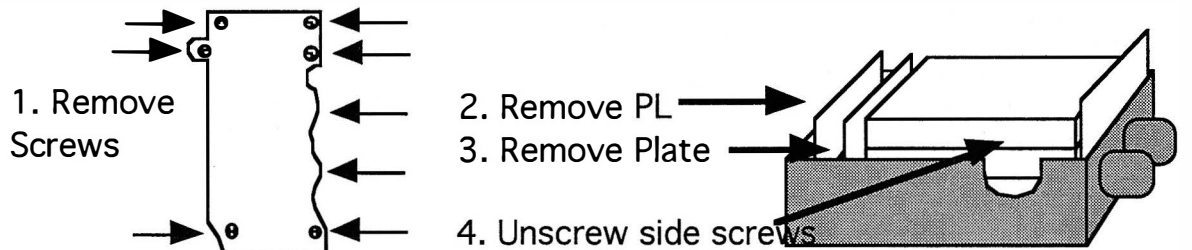
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## ICOM IC-W2A

### EXPANDED RF

1. Remove battery and antenna.
2. Remove screws from back panel and battery plate and open radio.
3. Remove PL deck and power plate.
4. Unplug VHF & UHF decks.
5. **Remove Chip diode D22.**
6. **Attach Chip diodes to location points A & B.**  
(Diode MA133 - ICOM part # 1790000860)
7. Reassemble the radio.
8. **Reset the CPU** (Push and hold [FUNCTION] & [A] & [CLR] and turn radio on)



#### IC-W2A KEYBOARD COMMANDS:

|                  |                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------|
| RX Expansion     | Push and hold [#] & [B] & [3] and turn power on.                                                |
| Direct Entry     | Set VFO PL to 100 Hz on VHF and UHF!!!!<br>[F] & [SET] to select 1, 10, or 100 MHz freq. entry. |
| XBand Repeat on  | Hold [FUNCTION] press [2] and then [#].                                                         |
| XBand Repeat off | Push and hold [FUNCTION] & [#].                                                                 |
| Display Test     | Push and hold [#] & [LIGHT] & [B]                                                               |

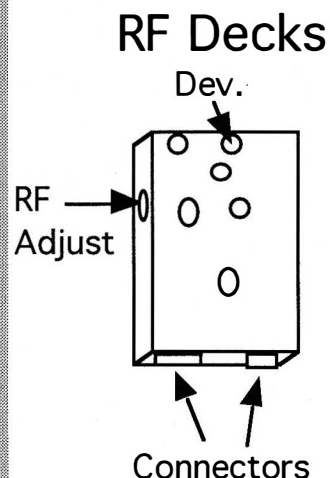
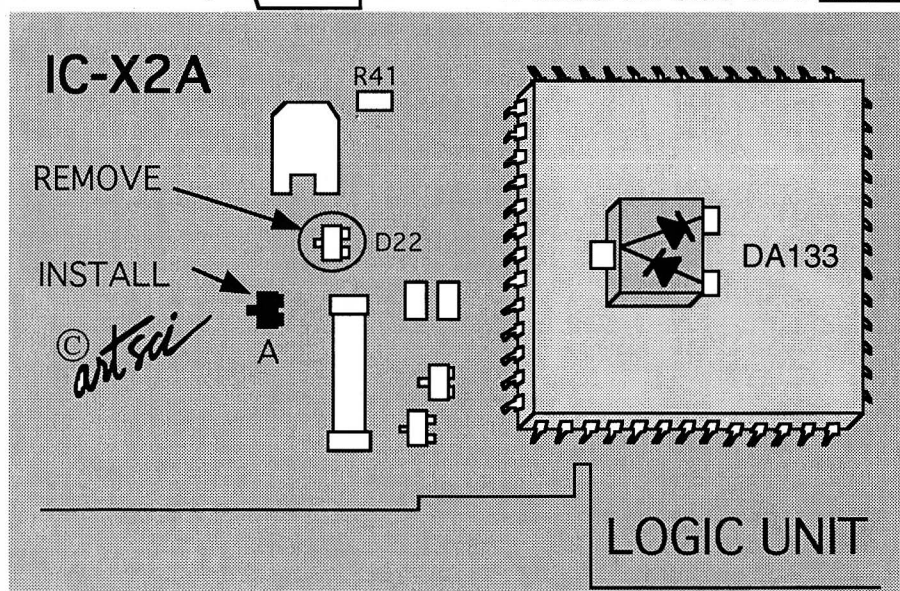
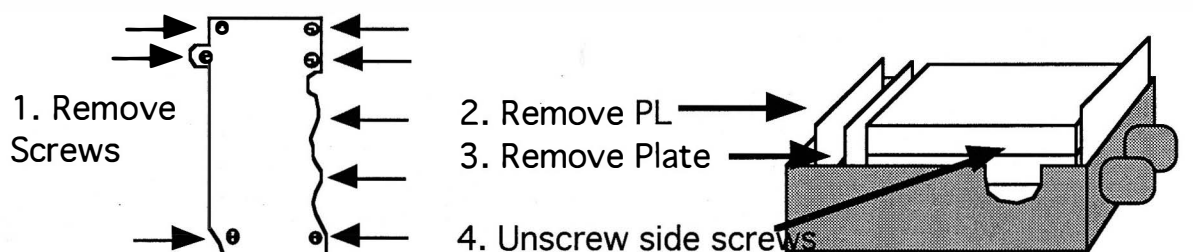


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

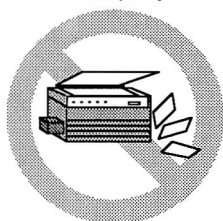
## ICOM IC-X2A EXPANDED RF

1. Remove battery and antenna.
2. Remove screws from back panel and battery plate and open radio.
3. Remove PL deck and power plate.
4. Unplug UHF & 1.2 GHz decks.
5. **Remove Chip diode D22.**
6. **Attach Chip diodes to location point A.**  
(Diode MA133 - ICOM part # 1790000860)
7. Reassemble the radio.
8. **Reset the CPU** (Push and hold [FUNCTION] & [A] & [CLR] and turn radio on)



### IC-W2A KEYBOARD COMMANDS:

|                  |                                                      |
|------------------|------------------------------------------------------|
| RX Expansion     | Push and hold [#] & [B] & [3] and turn power on.     |
| Direct Entry     | Set VFO PL to 100 Hz on VHF and UHF!!!!              |
|                  | [F] & [SET] to select 1, 10, or 100 MHz freq. entry. |
| XBand Repeat on  | Hold [FUNCTION] press [2] and then [#].              |
| XBand Repeat off | Push and hold [FUNCTION] & [#].                      |
| Display Test     | Push and hold [#] & [LIGHT] & [B]                    |



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

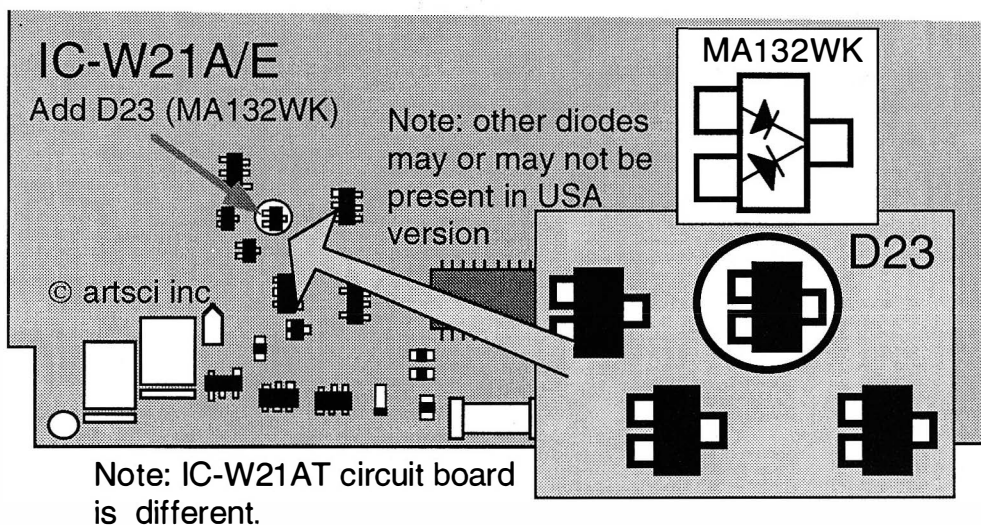
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-W21A/E

### EXPANDED RF/Cross Band repeater

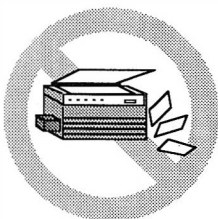
1. Remove battery and antenna.
2. Remove screws and open radio.
3. Locate LOGIC board.
4. Locate position D23 and **add Diode D23** (MA132WK)
5. Reassemble the radio.
6. **Reset the Microprocessor** (Press [LIGHT] +[MONI] & turn power on)
7. Enter Expand function (Press [LIGHT] +[MONI] + [V/M] & turn power on)

Range: 108 - 136 MHz AM RX, 136 - 179 MHz FM RX,  
311 - 460 MHz FM, 800 - 945 MHz



#### IC-21A CROSSBAND REPEATER COMMAND-

1. Press [LIGHT] & [V/M] & turn power on
  2. Set frequencies.
  3. Press [FUNC] & [LIGHT] - Lock Frequencies
  4. Turn radio off
  5. Press [FUNC] & [MONI] & [PRT] & turn power on. (Press [MONI] to stop TX.)
- CLEAR: Press [FUNC] & [LIGHT]



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

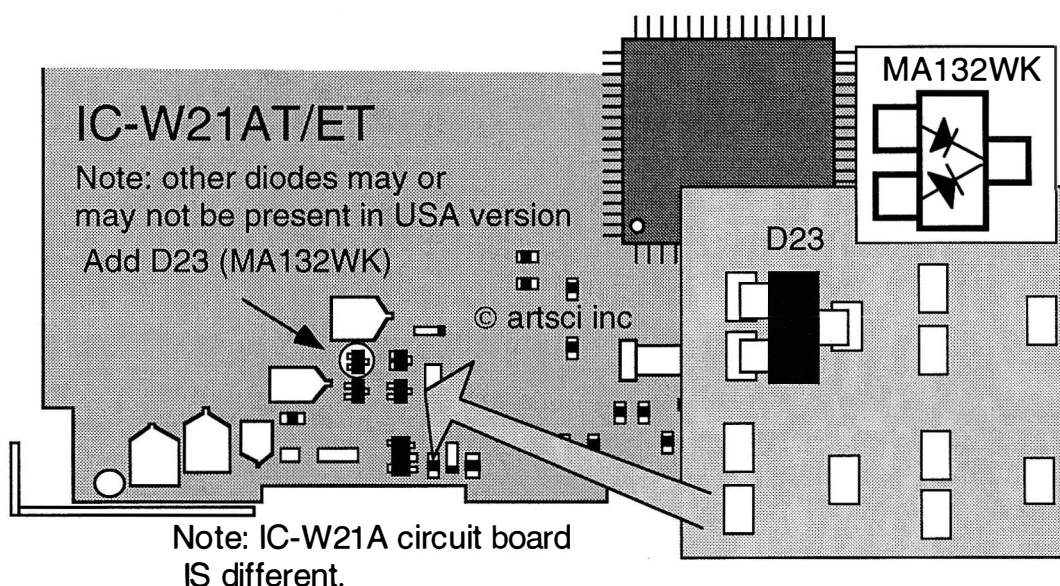
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM IC-W21AT/ET

### EXPANDED RF/Cross Band repeater

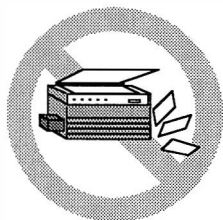
1. Remove battery and antenna.
2. Remove screws and open radio.
3. Locate LOGIC board.
4. Locate position D23 and **add Diode D23** (MA132WK)
5. Reassemble the radio.
6. **Reset the Microprocessor** (Press [FUNC] +[A] + [V/SCAN] & turn power on)
7. Enter Expand function (Press [B] & [#] & turn power on)

Range: 108 - 138 MHz AM RX, 136 - 179 MHz FM RX,  
311 - 460 MHz FM, 800 - 945 MHz



#### IC-21AT/ET CROSSBAND REPEATER COMMAND-

1. Set Both VHF & UHF frequencies
  2. Set [KEY LOCK] and press [F] & [C] and turn power off
  3. Press [F] & [MONI] & [PRT-M] and turn power on.
- CLEAR: Press [F] & [C]



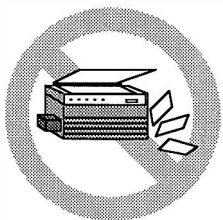
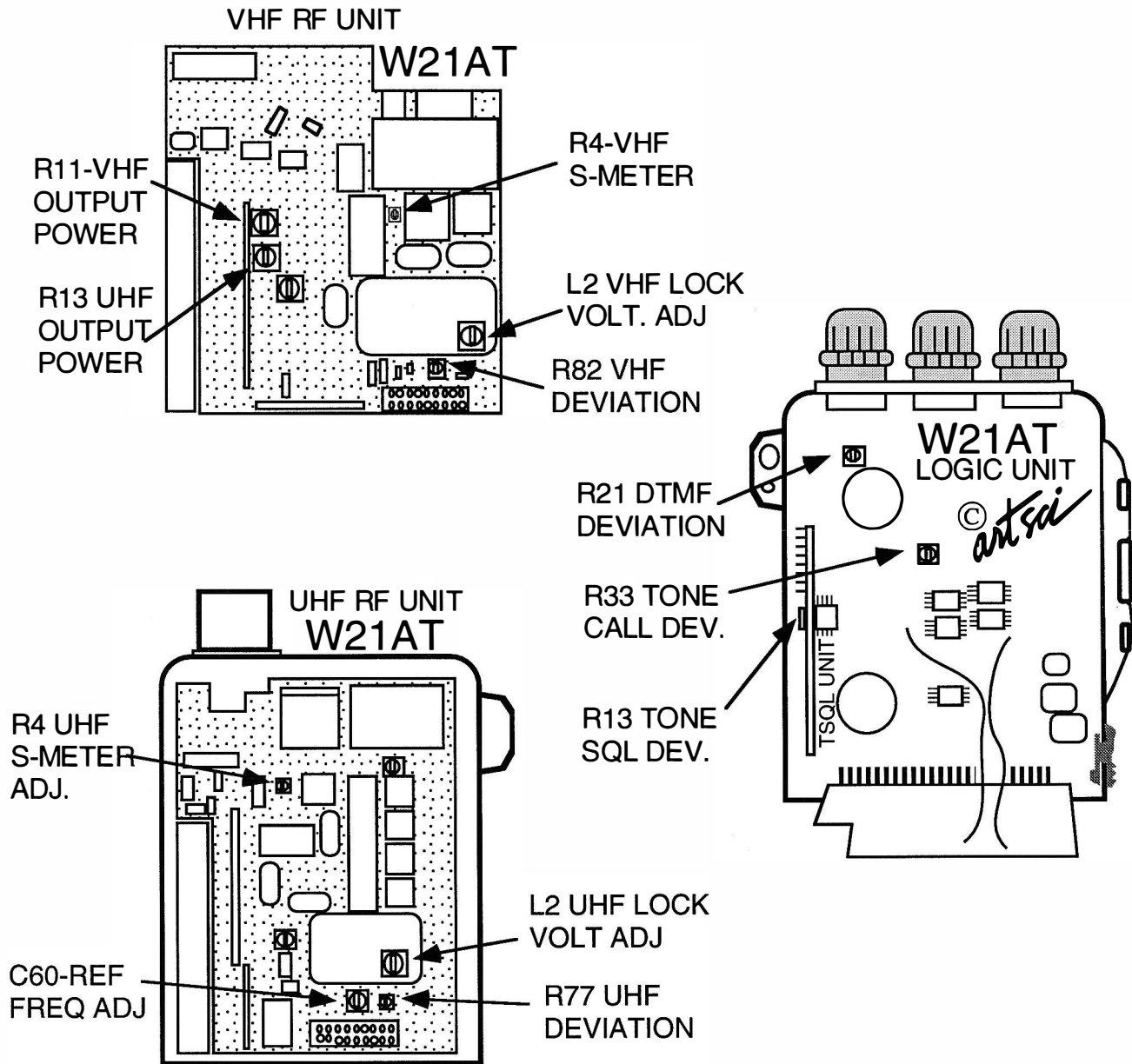
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM IC-W21AT/ET

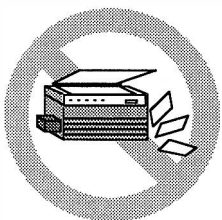
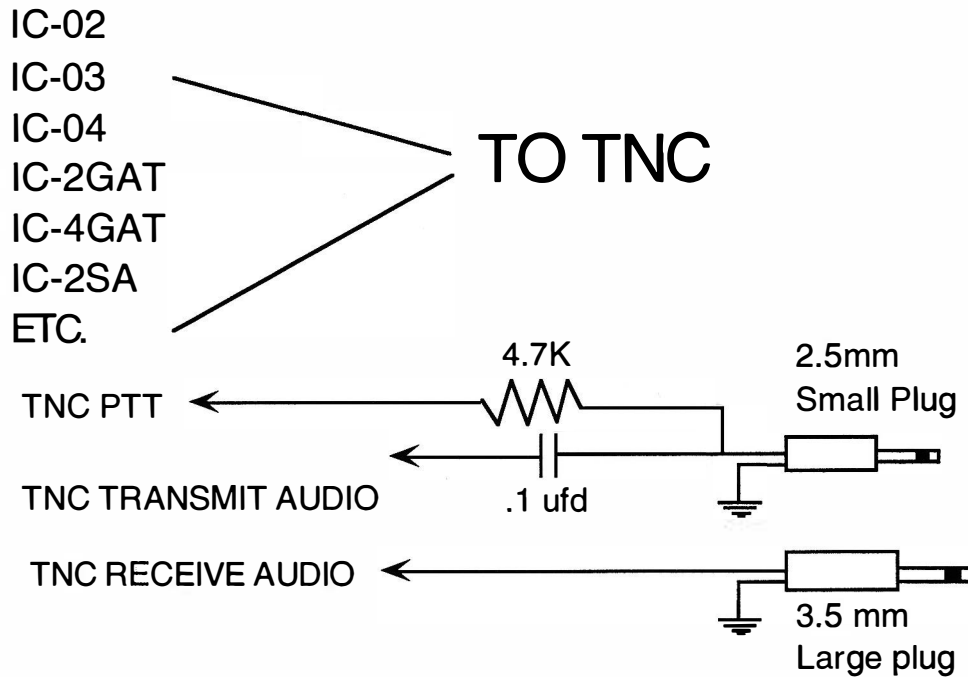
## ALIGNMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM HT's TO TNC'S INTERFACE CABLES



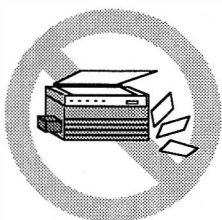
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM RADIOS

## CPU RESET

- 2GAT      TURN RADIO ON, HOLD [LIGHT] & [FUNCTION], TURN RADIO OFF, TURN ON AND RELEASE BUTTONS.
- 02AT      BELOW SERIAL # 34,000 - PUSH BUTTON ON MAIN BOARD NEXT TO LITHIUM BATTERY.  
ABOVE SERIAL # 34,000 - HOLD [FUNCTION] AND TURN RADIO ON.
- 2SA        HOLD [LIGHT] & [MONITOR] AND TURN RADIO ON.
- 2SAT      HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- 2SRA      HOLD [FUNCTION] & [A] & CLR] & TURN RADIO ON.
- u2AT      HOLD [LIGHT] AND TURN RADIO ON.
- 03AT      BELOW SERIAL # 34,000- PUSH BUTTON ON MAIN BOARD NEXT TO LITHIUM BATTERY.  
ABOVE SERIAL # 34,000 - HOLD [FUNCTION] AND TURN RADIO ON.
- 3SA        HOLD [LIGHT] & [MONITOR] AND TURN RADIO ON.
- 3SAT      HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- 4GAT      TURN RADIO ON, HOLD [LIGHT] & [FUNCTION], TURN RADIO OFF, TURN ON AND RELEASE BUTTONS.
- 04AT      BELOW SERIAL # 34,000 - PUSH BUTTON ON MAIN BOARD NEXT TO LITHIUM BATTERY.  
ABOVE SERIAL # 34,000 - HOLD [FUNCTION] AND TURN RADIO ON.
- 4SA        HOLD [LIGHT] & [MONITOR] AND TURN RADIO ON.
- 4SAT      HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- 4SRA      HOLD [FUNCTION] & [A] & CLR] & TURN RADIO ON.
- u4AT      HOLD [LIGHT] AND TURN RADIO ON.
- 12AT      HOLD [FUNCTION] AND TURN RADIO ON.
- 12GAT      TURN RADIO ON, HOLD [LIGHT] & [FUNCTION], TURN RADIO OFF, TURN ON AND RELEASE BUTTONS.



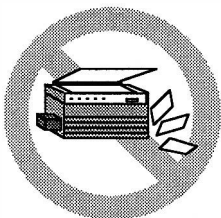
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM RADIOS

### CPU RESET (PART 2)

- 24AT     HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- 27        PUSH RESET BUTTON UNDER TOP COVER
- 28        INSERT A TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVER  
           PRESSING THE RESET BUTTON.
- 32AT     HOLD [FUNCTION] & [A] & [LIGHT] AND TURN POWER ON.
- 37        PUSH RESET BUTTON UNDER TOP COVER.
- 38        INSERT TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVER PRESSING THE  
           RESET BUTTON.
- 47        PUSH RESET BUTTON UNDER TOP COVER
- 48        INSERT TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVER PRESSING THE  
           RESET BUTTON.
- 228       HOLD [SQUELCH/MONITOR] & [LOCK] AND TURN RADIO ON.
- 229A     HOLD [SET] & [MW] AND TURN RADIO ON.
- 271       REPROGRAM RAM CARD.
- 275       HOLD [M-CL] AND TURN RADIO ON.
- 375       HOLD [M-CL] AND TURN RADIO ON.
- 448       HOLD [SQUELCH/MONITOR] & [CLOCK] AND TURN RADIO ON.
- 471       REPROGRAM RAM CARD.
- 475       HOLD [M-CL] AND TURN RADIO ON.
- 575       HOLD [M-CL] AND TURN RADIO ON.
- 725       HOLD [FUNCTION] & [MW] AND TURN RADIO ON.
- 726       HOLD [FUNCTION] & [MW] AND TURN RADIO ON.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any  
modified radio may be a violation of FCC rules. Some modifications have not been  
tested. The Author, Publisher and all other parties takes NO responsibility or liability  
for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

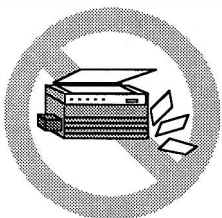
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# ICOM RADIOS

## CPU RESET (PART 3)

- 761 HOLD [M-CLEAR] AND TURN RADIO ON.
- 765 HOLD [M-CLEAR] AND TURN RADIO ON.
- 781 HOLD [M-CLEAR] AND TURN RADIO ON.
- 900 HOLD [MR] AND TURN POWER OFF AND THEN ON AGAIN.
- 901A TURN RADIO ON, PUCH [CHECK] & [MW]
- 970 HOLD [MW] AND TURN RADIO ON.
- 1 200 INSERT TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVER PRESSING THE RESET BUTTON.
- 1 201 HOLD [SQUELCH/MONITOR] & [LOCK] AND TURN RADIO ON.
- 1 220 TURN RADIO OFF FOR A FEW MINUTES AND THEN PRESS SWITCH S1 ON LOGIC BOARD.
- 1 271 REPROGRAM RAM CARD.
- 1 275 HOLD [M-CL] AND TURN RADIO ON.
- 1520 TURN RADIO OFF FOR A FEW MINUTES AND THEN PRESS SWITCH S1 ON LOGIC BOARD.
- 1 600 TURN POWER OFF, WAIT A FEW MINUTES AND TURN POWER ON.
- 3 200 HOLD [F] BUTTON AND TURN POWER ON.
- 3 210 HOLD [SQUELCH/MONITOR] & [LOCK] AND TURN RADIO ON.
- 3 220 HOLD [SET] & [MW] AND TURN RADIO ON
- 2 400 HOLD [SUB VOL] AND [MW] AND TURN RADIO ON.
- 2 500 HOLD [SUB VOL] AND [MW] AND TURN RADIO ON.



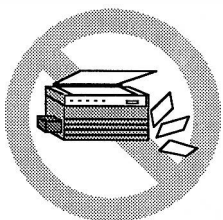
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## ICOM RADIOS

### CPU RESET (PART 4)

- 4020      TURN RADIO OFF FOR A FEW MINUTES AND THEN PRESS SWITCH S1 ON LOGIC BOARD.
- 4520      TURN POWER OFF, WAIT A FEW MINUTES AND TURN POWER ON.
- A2        HOLD [FUNCTION] & [PTT] & TURN POWER ON.
- A20      HOLD [FUNCTION] & CLEAR] & TURN POWER ON.
- A21      HOLD [FUNCTION] & CLEAR] & TURN POWER ON.
- H8        RECLONE OR HOLD [PTT] & [CLONE] & TURN POWER ON.
- H10      RECLONE OR HOLD [PTT] & [CLONE] & TURN POWER ON.
- H16      RECLONE
- H18      RECLONE
- H19      RECLONE
- M5        PUSH BUTTON ON MAIN BOARD NEXT TO LITHIUM BATTERY.
- M7        TURN RADIO ON & HOLD [HI/LOW] & [LOCK] & TURN OFF POWER.  
            PUSH [CH16D] TO SELECT DIAL MODE.
- M11      TURN ON & HOLD [LIGHT] & [FUNCTION] & TURN OFF POWER & ON AGAIN.  
            PUSH [CH16D] TO SELECT DIAL MODE.
- M55      REMOVE CLEAR PLASTIC SCREW FROM BOTTOM COVER,  
            INSERT A TOOTHPICK TO PUSH RESET BUTTON.
- M56      TURN RADIO ON & HOLD [CH16] & [MR] & TURN OFF & TURN ON.
- M80      DISCONNECT LITHIUM BATTERY.
- M100     TURN RADIO ON & HOLD [SQUELCH] KNOB & PRESS RESET.



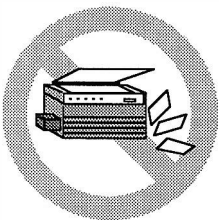
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# ICOM RADIOS

## CPU RESET (PART 5)

- M120      TURN RADIO ON & HOLD [CH16] & [USA], TURN RADIO OFF AND BACK ON.
- M500      HOLD [DIMMER] & 13/67] & TURN POWER ON.
- R1        HOLD [FUNCTION] & [CL] & TURN POWER ON.
- R72        HOLD [MW] & TURN POWER ON.
- R100      HOLD [FUNCTION] & [ENT] & TURN POWER ON.
- R9000     HOLD [M-WRITE] AND TURN RADIO ON.
- U8        RECLONE OR HOLD [PTT] & [CLONE] & TURN POWER ON.
- U10      RECLONE OR HOLD [PTT] & [CLONE] & TURN POWER ON.
- U16      RECLONE.
- U18      RECLONE
- U19      RECLONE.
- U200     RECLONE
- U400     RECLONE
- V100     RECLONE
- V200     RECLONE
- W2A      HOLD [FUNCTION] & [A] & [CLR] AND TURN RADIO ON.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

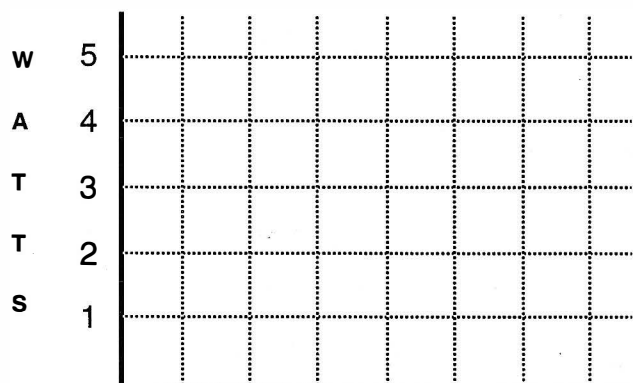
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

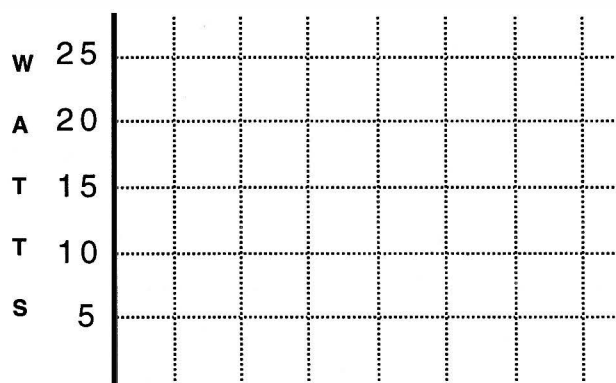
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

| Description                    | Before      | After       |
|--------------------------------|-------------|-------------|
| Power out (Low)                | _____ Watts | _____ Watts |
| Power out (High)               | _____ Watts | _____ Watts |
| Frequency Error (Simplex)      | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)       | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band) | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| PL Deviation                   | _____ Hz    | _____ Hz    |
| DTMF Deviation                 | _____ KHz   | _____ KHz   |
| Audio Deviation                | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr   | _____ MHz   | _____ MHz   |



Frequency

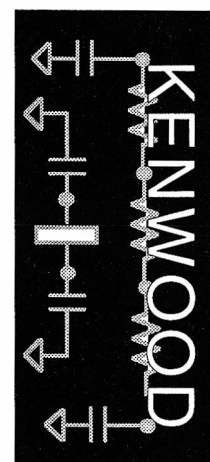


Frequency

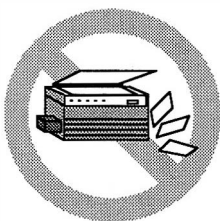
# Radio / Tech Modifications

## Kenwood Radio Modifications

| <b>Model</b> | <b>Modification</b>                  | <b>Page #</b> |
|--------------|--------------------------------------|---------------|
| TH-21A       | Expanded RF / Alignment Control..... | 5             |
| TH-25A       | Expanded RF / Alignment Control..... | 6             |
|              | Alignment Controls.....              | 7             |
| TH-26A       | Expanded RF - Mars/Cap+.....         | 8             |
|              | Alignment Controls.....              | 9             |
| TH-27A       | Expanded RF - Mars/Cap+.....         | 10            |
|              | Alignment Controls.....              | 11            |
| TM-28A       | Expanded RF.....                     | 12            |
|              | Alignment Controls.....              | 13            |
| TH-31A/BT    | Alignment Controls.....              | 14            |
| TH-41A/BT    | Alignment Controls.....              | 15            |
| TH-45A       | Expanded RF.....                     | 16            |
|              | Alignment Control.....               | 17            |
| TH-48A       | Expanded RF.....                     | 18            |
|              | Alignment Controls.....              | 19            |
| TH-55A       | Alignment Control.....               | 20            |
| TH-75A       | Expanded RF - Mars/Cap+.....         | 21            |
| TH-77A       | Expanded RF - Mars/Cap+.....         | 22            |
| TH-78A       | Expanded RF - Mars/Cap+.....         | 23            |
|              | Alignment Controls.....              | 25            |
| TH-215       | Expanded RF.....                     | 26            |
|              | Alignment Controls.....              | 27            |
| TH-315       | Expanded RF.....                     | 28            |
|              | Alignment Controls.....              | 29            |
| TM-221       | Expanded RF .....                    | 30            |
|              | Alignment Controls.....              | 31            |
| TM-231A      | Expanded RF.....                     | 32            |
|              | Alignment Controls.....              | 33            |
| TM-241A      | Expanded RF.....                     | 34            |
|              | Alignment Controls.....              | 35            |
| TM-321       | Alignment Controls.....              | 36            |
| TM-331       | Expanded RF / Alignment Control..... | 37            |
| TM-421       | Expanded RF .....                    | 38            |
|              | Alignment Controls.....              | 39            |
| TM-431A      | Expanded RF .....                    | 40            |
|              | Alignment Controls.....              | 41            |
| TM-441A      | Expanded RF .....                    | 42            |
|              | Alignment Controls.....              | 43            |



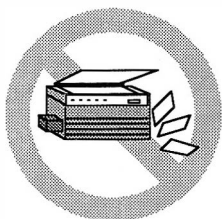
| <b>Model</b> | <b>Modification</b>                              | <b>Page # ]</b> |
|--------------|--------------------------------------------------|-----------------|
| TM-621       | Expanded RF / Cross Bands Repeater.....          | 4 4             |
|              | Alignment Controls.....                          | 4 5             |
| TM-631       | Expanded RF / Cross Bands Repeater.....          | 4 6             |
|              | Alignment Controls.....                          | 4 7             |
| TM-701A      | Expanded RF/Deviation Controls/X Band Rep.....   | 4 8             |
|              | Alignment Controls.....                          | 4 9             |
| TM-721       | Expanded RF/Deviation Controls/X Band Rep.....   | 5 0             |
|              | Alignment Controls.....                          | 5 1             |
| TM-731       | Expanded RF/Deviation Controls/X Band Rep.....   | 5 2             |
|              | Alignment Controls.....                          | 5 3             |
| TM-732       | Expanded RF.....                                 | 5 4             |
|              | Alignment Controls.....                          | 5 5             |
| TM-741       | Expanded RF/X Band Rep.....                      | 5 8             |
| TM-742       | Expanded RF.....                                 | 5 8             |
| TM-941       | X Band Rep.....                                  | 5 7             |
| TM-942       | Expanded RF.....                                 | 5 8             |
| TM-2530      | Expanded RF / Deviation Controls/X Band Rep..... | 5 9             |
| TM-2550      | Expanded RF / Deviation Controls/X Band Rep..... | 5 9             |
| TM-2570      | Expanded RF / Deviation Controls/X Band Rep..... | 5 9             |
| TR-751       | Expanded RF / Deviation Controls.....            | 6 0             |
| TR-2500      | Expanded RF - Mars/Cap+.....                     | 6 1             |
| TR-2600      | Expanded RF - Mars/Cap+.....                     | 6 2             |
| TS-50        | Expanded RF - Mars/Cap+.....                     | 6 3             |
| TS-140S      | Expanded RF - Mars/Cap+.....                     | 6 4             |
| TS-430S      | Expanded RF - Mars/Cap+.....                     | 6 5             |
| TS-440S      | Expanded RF - Mars/Cap+.....                     | 6 6             |
| TS-450S      | Expanded RF - Mars/Cap+.....                     | 6 7             |
| TS-680       | Expanded RF - Mars/Cap+.....                     | 6 8             |
| TS-690S      | Expanded RF - .....                              | 6 9             |
| TS-711       | Expanded RF - Mars/Cap+.....                     | 7 0             |
| TS-790A      | Expanded RF - Mars/Cap+.....                     | 7 1             |



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

| <b>Model</b> | <b>Modification</b>          | <b>Page # ]</b> |
|--------------|------------------------------|-----------------|
| TS-850S      | Expanded RF - Mars/Cap+..... | 7 2             |
| TS-930S      | Expanded RF - Mars/Cap+..... | 7 3             |
| TS-940       | Expanded RF - Mars/Cap+..... | 7 4             |
| TS-950SD     | Expanded RF - .....          | 7 5             |
| TS-2400      | Expanded RF - .....          | 7 6             |
| TW-4100      | Cross Bands Repeater.....    | 7 7             |
| TM SERIES    | TNC-2 Hookup.....            | 7 5             |



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

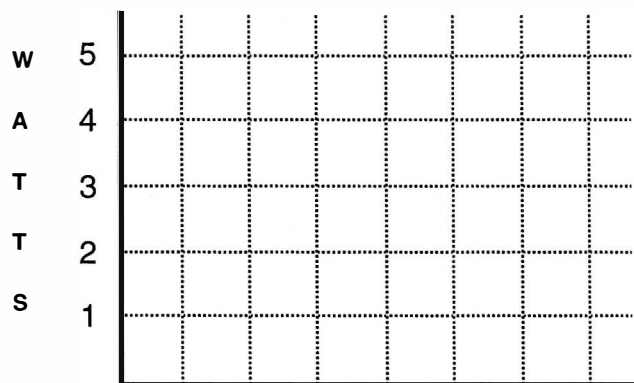
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

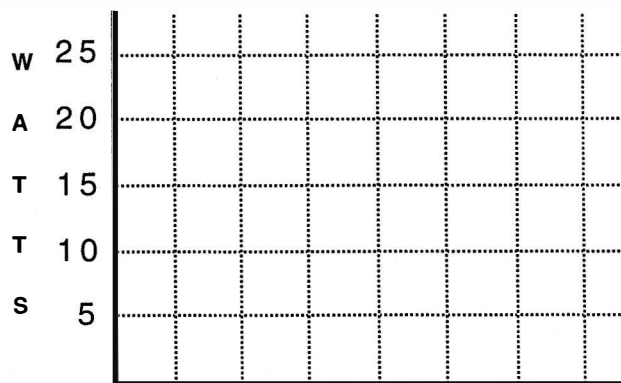
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

| Description                     | Before      | After       |
|---------------------------------|-------------|-------------|
| Power out (Low)                 | _____ Watts | _____ Watts |
| Power out (High)                | _____ Watts | _____ Watts |
| Frequency Error (Simplex)       | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)        | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band)  | _____ uv    | _____ uv    |
| Receive Sensitivity (_____ MHz) | _____ uv    | _____ uv    |
| Receive Sensitivity (_____ MHz) | _____ uv    | _____ uv    |
| PL Deviation                    | _____ Hz    | _____ Hz    |
| DTMF Deviation                  | _____ KHz   | _____ KHz   |
| Audio Deviation                 | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr     | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |



Frequency



Frequency

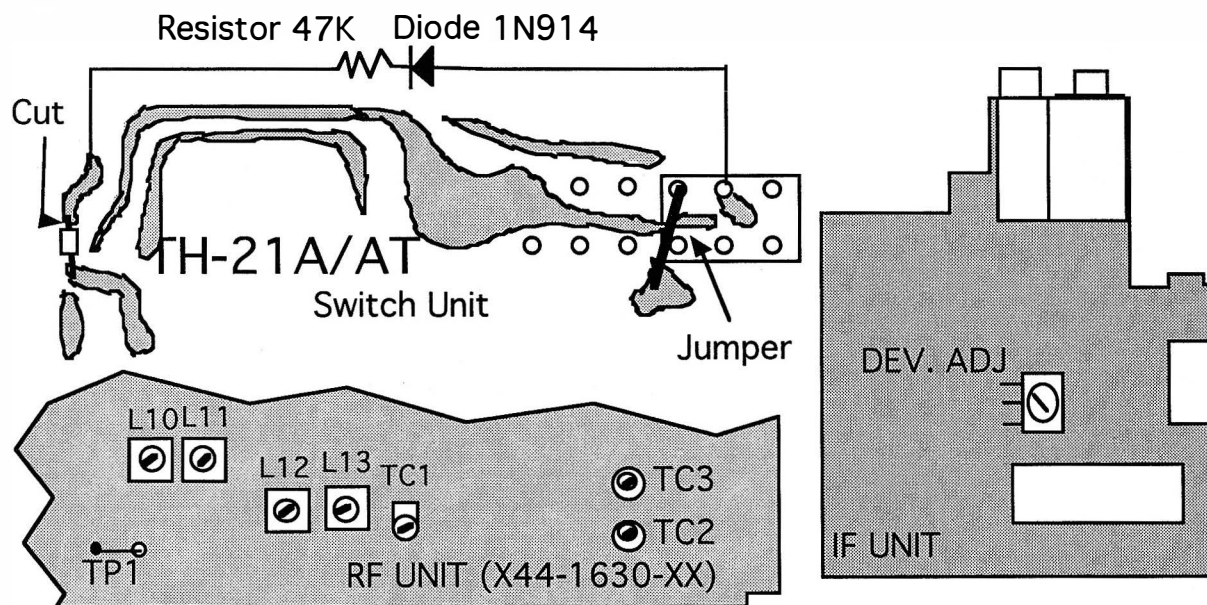


## KENWOOD TH-21A/AT

EXPANDED RF  
140-159 MHz

1. Disconnect the battery and antenna.
2. Remove knobs, antenna nut ring and plastic top
3. Remove front panel.
4. Locate switch unit. (PCB X41-1590-00) This unit has the Vol, SQL etc.
5. **Cut trace between R1 and D4, D5**
6. **Install a jumper** from the common point of R11, R5 & 5C to the corner of the tone switch.
7. **Install a 1N914 diode and 48K resistor** from the center top pin of the tone switch to the end of resistor R1. (R1 was cut in step 5).  
Note: Cathode end of the diode goes to the tone switch top center pin.  
Cathode end of a diode has the line.
8. Adjust L10,L11,L12,L13,TC1,TC2 & TC3 for maximum upper frequency range.
9. Reassemble the radio.

Depress the tone switch to receive from 140 to 149 MHz  
Tone switch off for 150 -159 MHz.



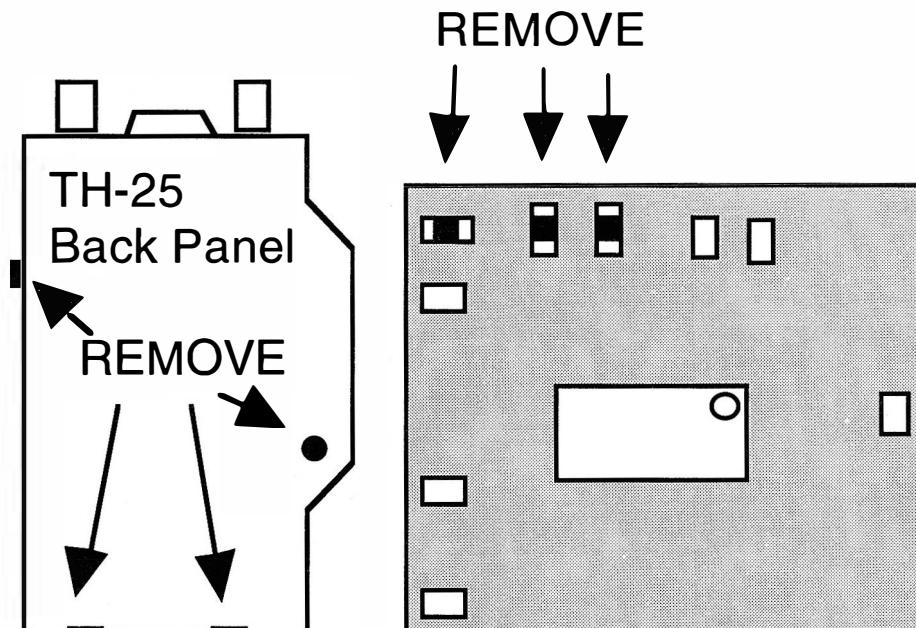
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

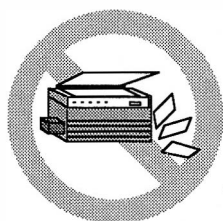
## KENWOOD TH-25A T

### EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the volume, squelch and tuning control knobs
3. Remove the nuts from the volume control and tuning controls.
4. Remove screw located by the PTT switch.
5. Remove screw by the speaker jack
6. Remove two screws from the battery plate.
7. Carefully pull the front panel from the radio. Do not break any wires.
8. Gently lift the top panel from the radio by pulling it forward and then upwards.  
The O ring on the BNC connector will cause some tension.
9. Rotate the top panel towards the front of the radio to expose the .75" X .75" board.
10. **Remove chip resistors R19, R20 & R21.**
11. Reassemble the radio.
12. **RESET the CPU.** Hold down [M] and turn power on.



MORE ---

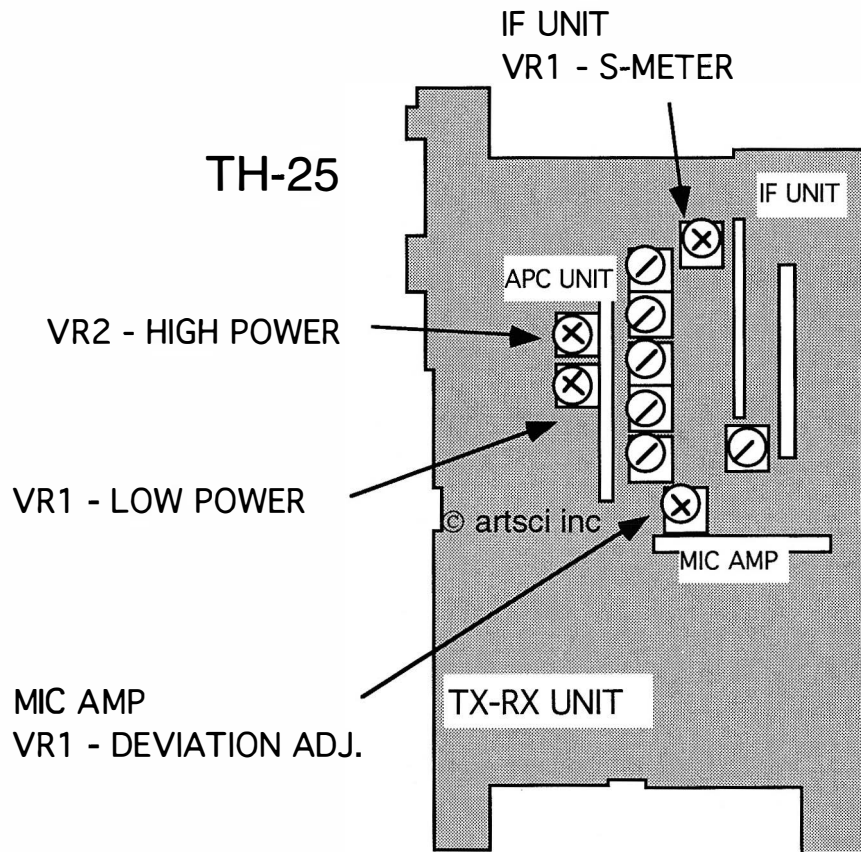


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-25AT

## ALIGNMENT CONTROLS



DTMF LEVEL -  
VR1 ON SIGNALING UNIT



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

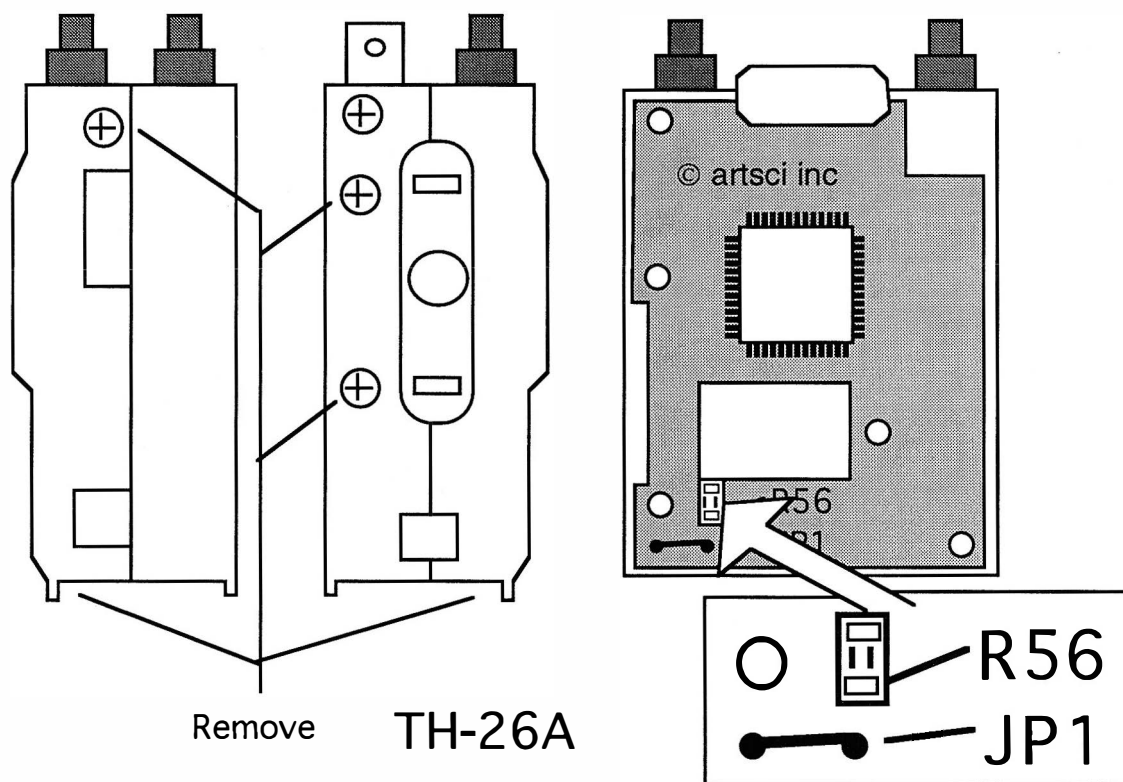
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TH-26A

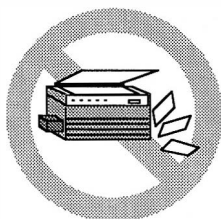
### EXPANDED RF

1. Disconnect the power and antenna.
2. Remove 3 screws from the case and 2 from the battery plate.
3. Open the radio.
4. **Remove jumper JP1.** Use a soldering iron the remove the jumper. Do not pull the jumper or overheat the board.
5. Unsolder and **remove chip resistor R56.**
6. Reassemble the radio. Carefully re-seat the O-Ring on the BNC connector.
7. **Reset the microprocessor.** (Press and hold the [F] key and turn the power on.)

Note: Automatic offset selection will be disabled when this mod is performed.



MORE ---

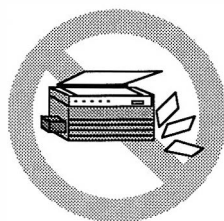
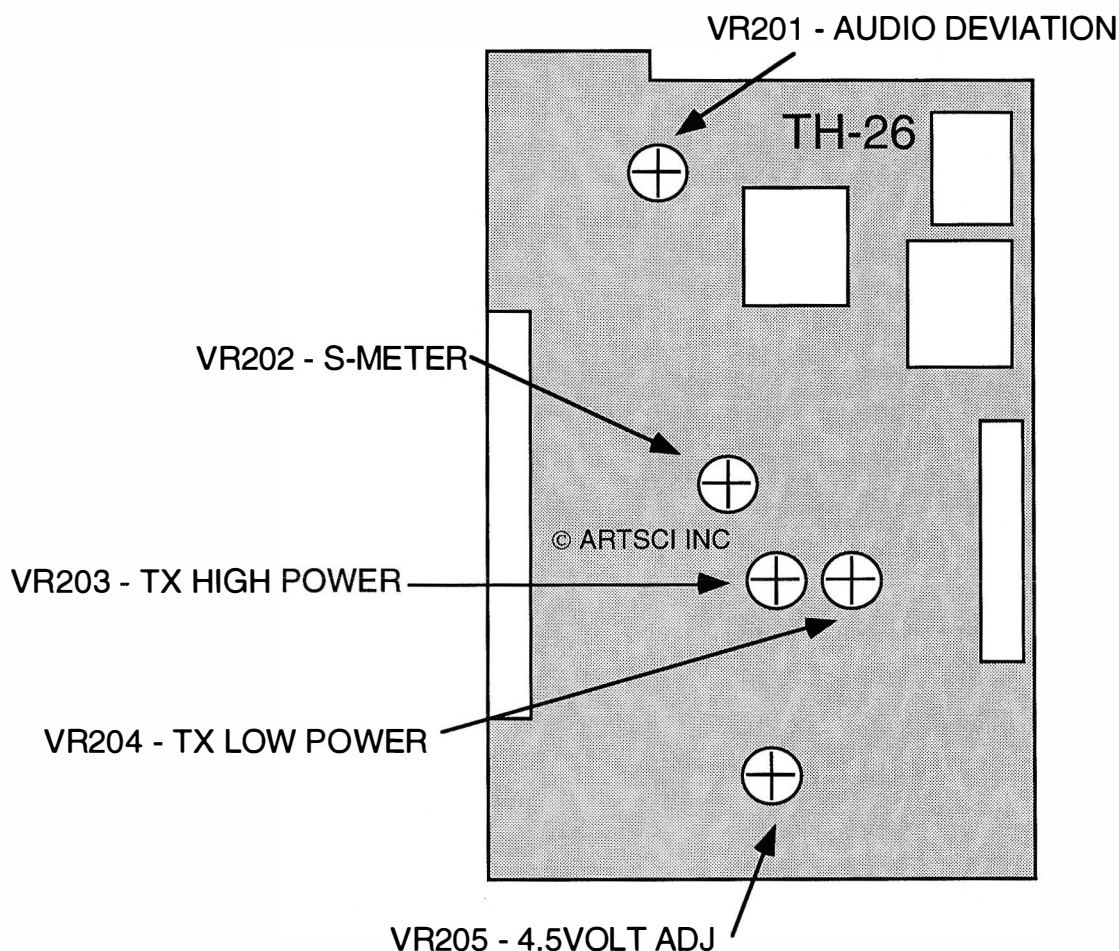


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-26A

## ALIGNMENT CONTROLS



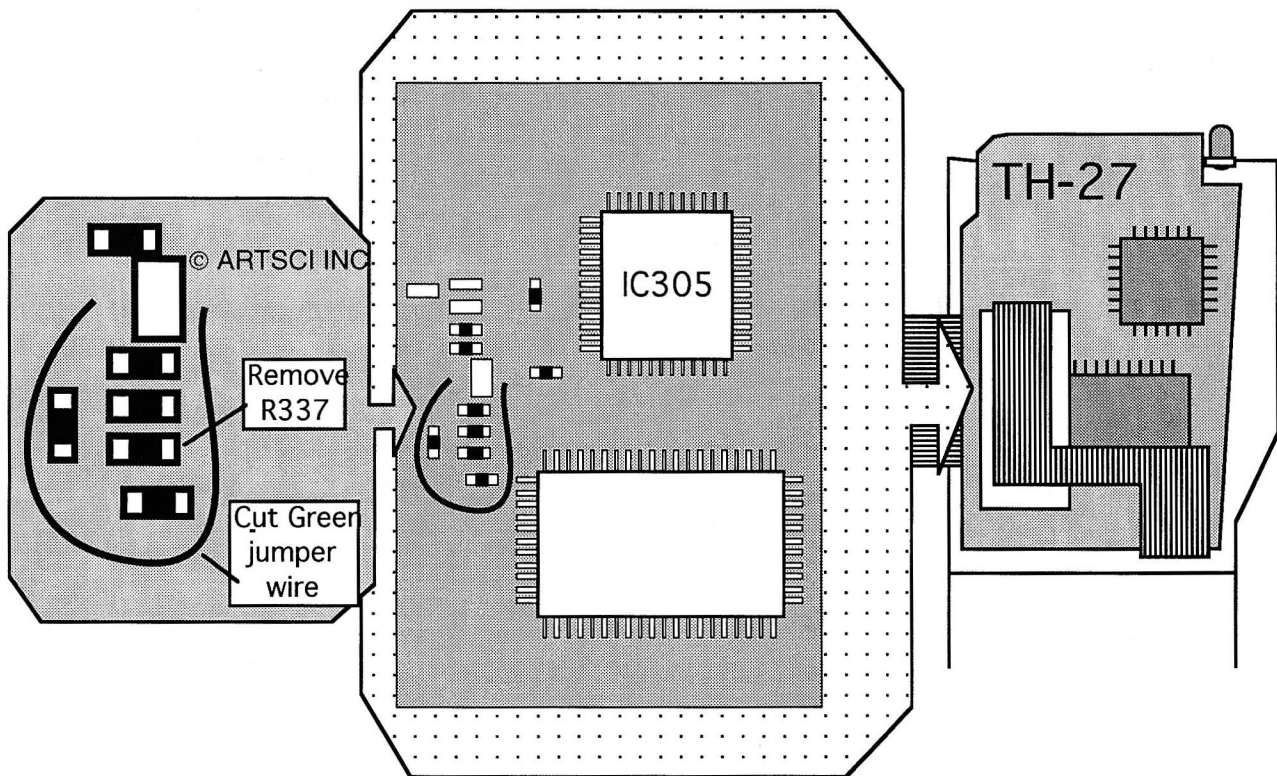
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

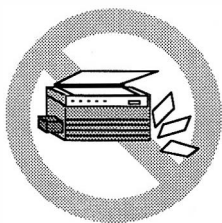
## KENWOOD TH-27A

### EXPANDED RF

1. Disconnect the Power and antenna.
2. Remove 4 screws from the back panel.
3. Open the bottom of the front panel first and slide the panel downward.
4. Open the radio being careful not to break the flex cable.
5. Move the tone board out of the way to expose the green jumper wire located inside the front panel assembly.
6. **Cut the GREEN Jumper wire.**
7. **Remove chip resistor R337.** (Disables AM receive & auto offset)
8. Reassemble the radio. Carefully re-seat the O-Ring on the BNC connector.
9. **Reset the Microprocessor.** (Press and hold the [M] key and turn the power on.)



MORE ---

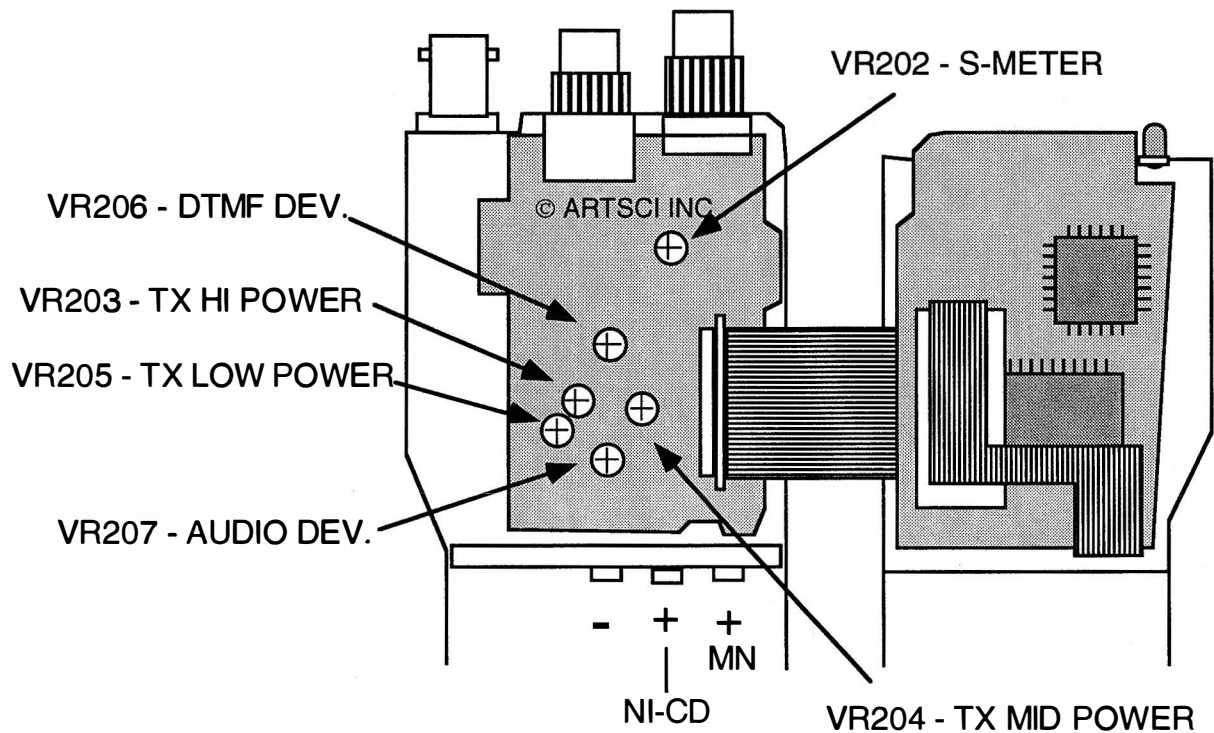


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-27A

## ALIGNMENT POINTS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TH-28A

## EXPANDED RF

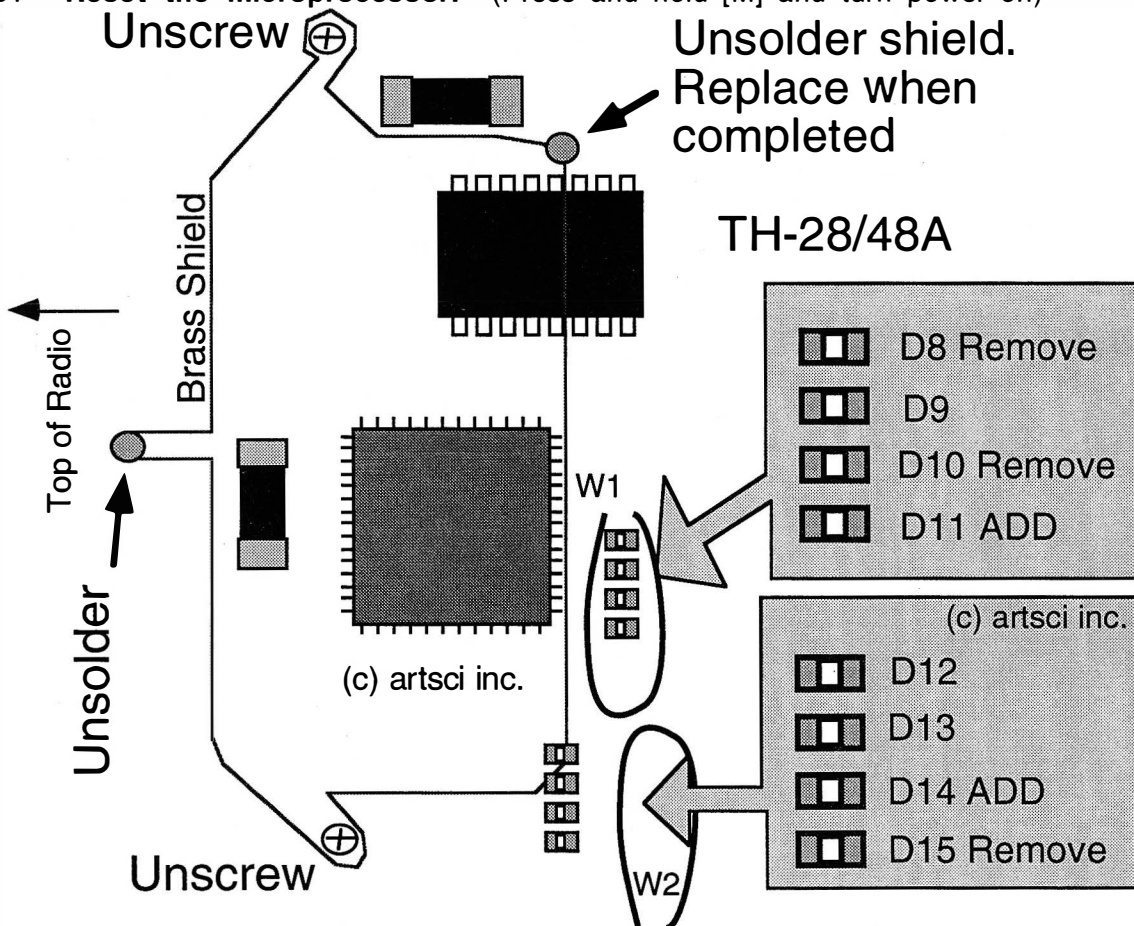
1. Disconnect the Battery and antenna.
2. Remove 4 back case screws and open the radio.

**NOTE : THERE ARE 2 VERSIONS OF THIS RADIO.**

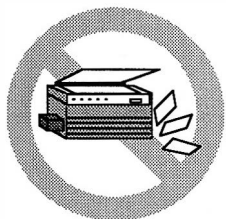
The later versions have 2 green jumper wires.

**Cut W2 jumper only and go to step 8 below**

3. Locate & Unsolder the two solder tack point on the shield. (Not required in later version)
4. Remove the two screws holding the shield.
5. Locate chip diode positions D8....D15. (part # MA110 or 1SS355)
6. **Remove Diode D8,D10 & D15.** (save the diodes)
7. **Install Diodes D11 & D14.** (used diodes removed in the previous step)
8. Reassemble the radio.
9. **Reset the microprocessor.** (Press and hold [M] and turn power on)



W1 & W2 only on later versions **MORE --**



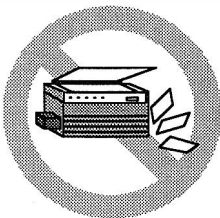
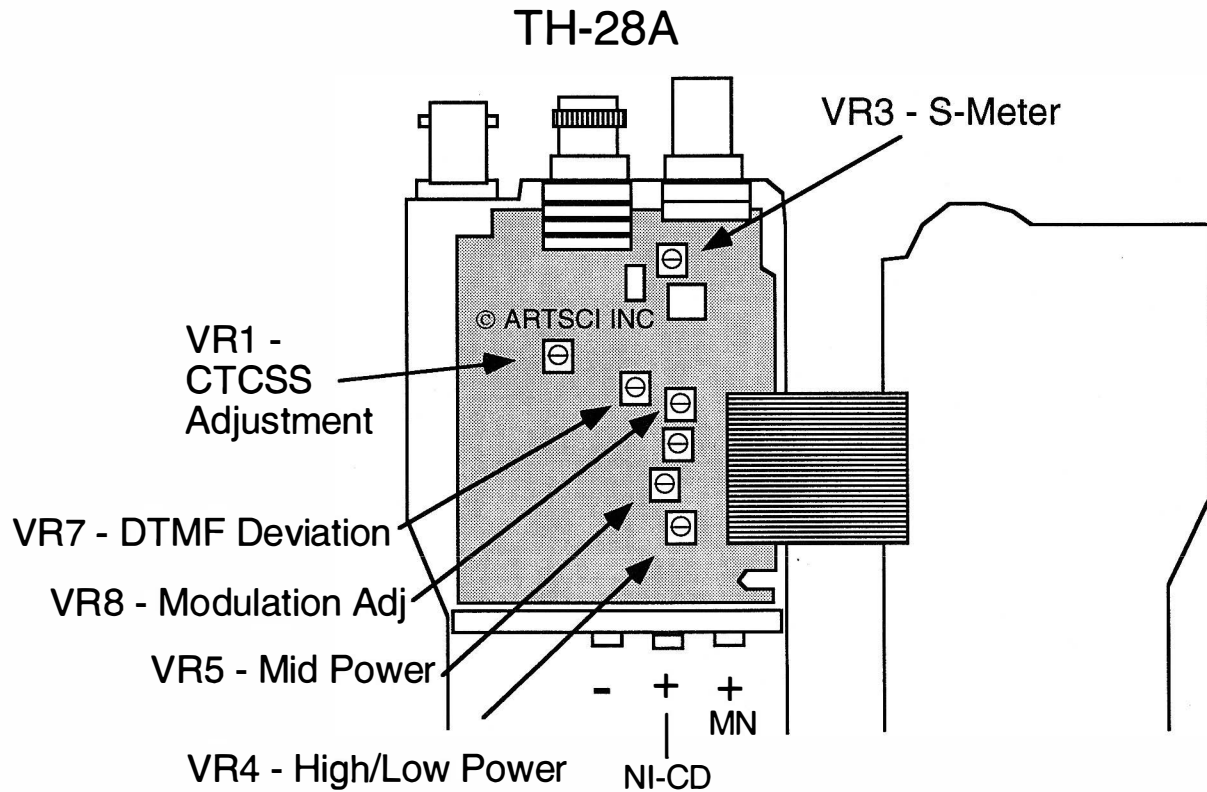
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TH-28A

## ALIGNMENT POINTS



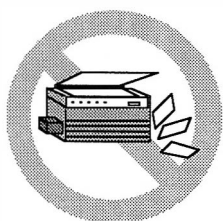
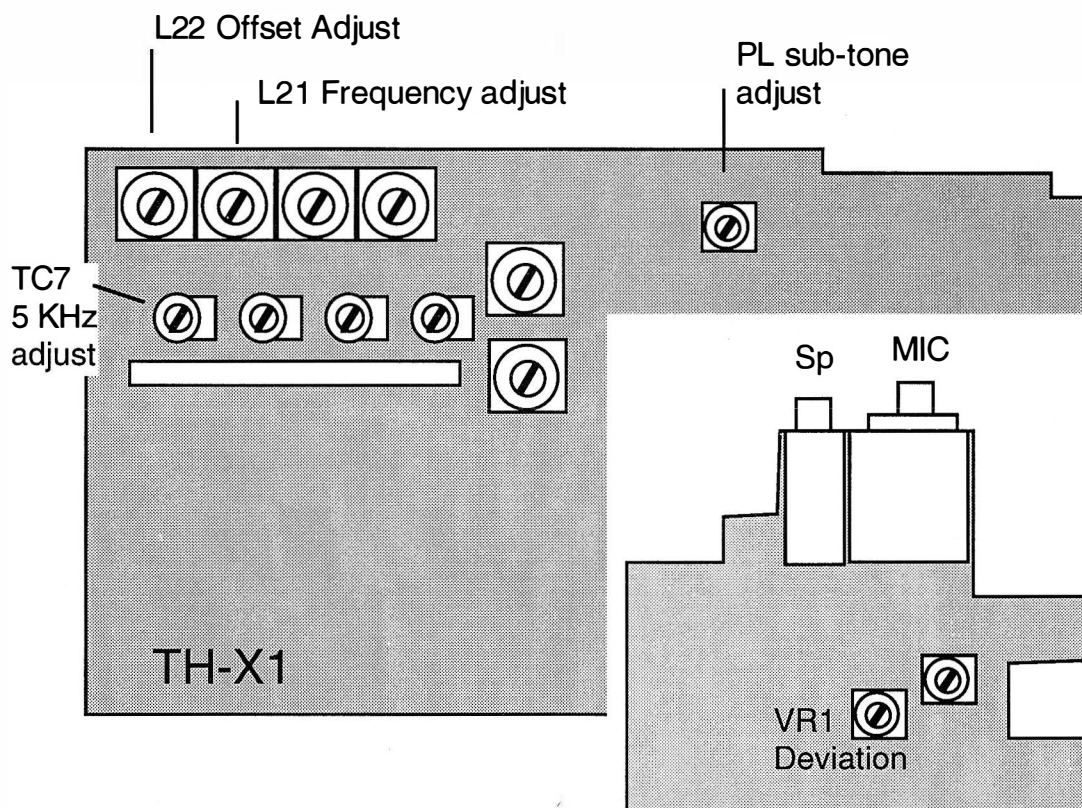
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-31 A/BT

## ADJUSTMENT CONTROLS

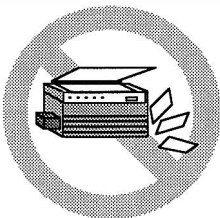
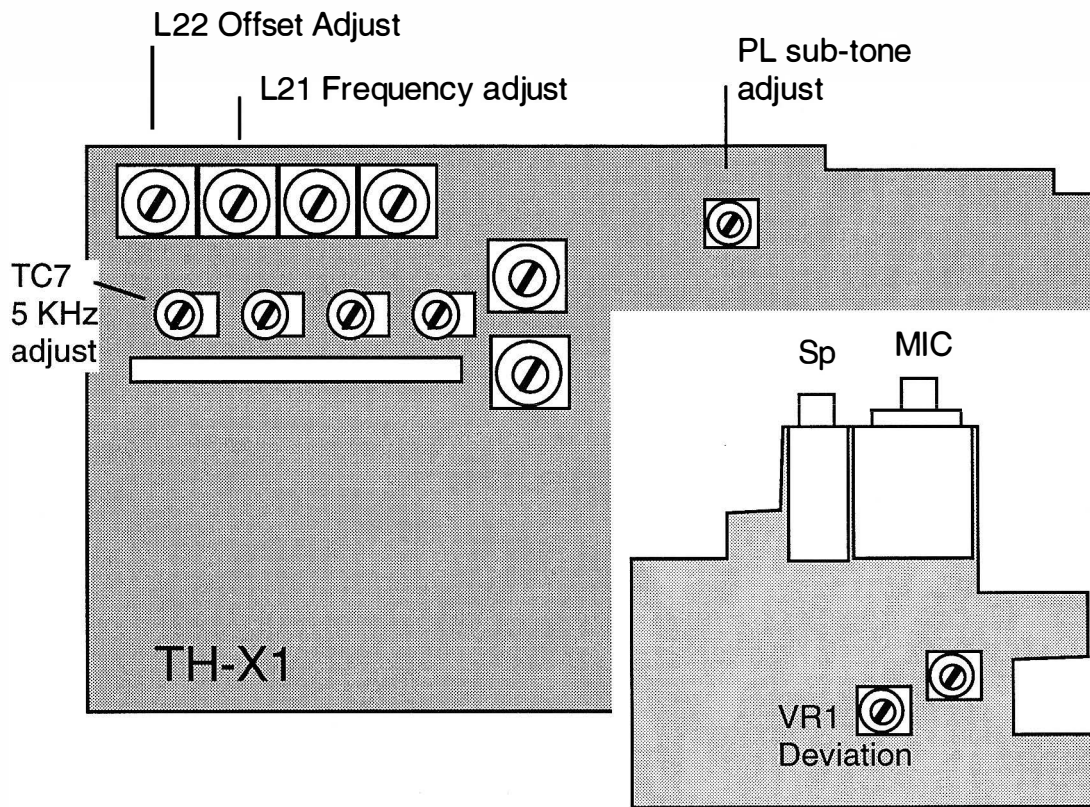


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-41 A/BT

## ADJUSTMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

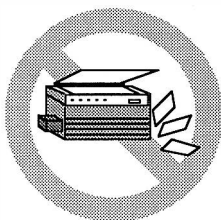
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TH-45AT

### EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the volume, squelch and tuning control knobs
3. Remove the nuts from the volume control and tuning controls.
4. Remove screw located by the PTT switch.
5. Remove screw by the speaker jack
6. Remove two screws from the battery plate.
7. Carefully pull the front panel from the radio. Do not break any wires.
8. Gently lift the top panel from the radio by pulling it forward and then upwards.  
The O ring on the BNC connector will cause some tension.
9. Rotate the top panel towards the front of the radio to expose the .75" X .75" board.
10. **Remove chip resistors R18 & R28.**
11. Reassemble the radio.
12. **RESET the CPU.** (Hold down [M] and turn power on.)

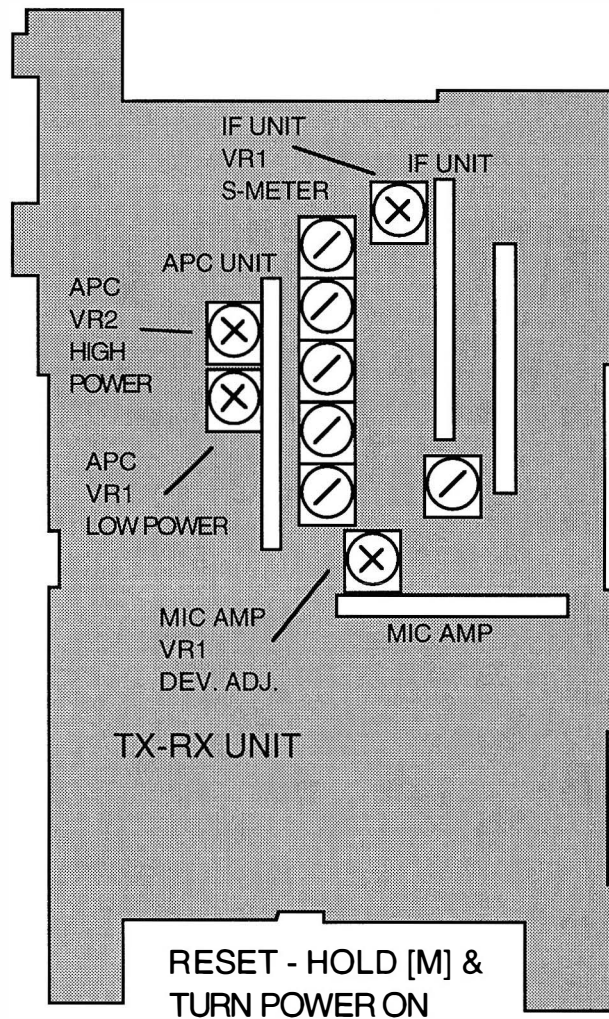


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

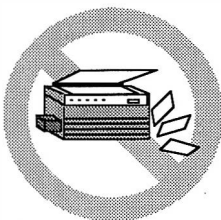
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-45A/AT

## ADJUSTMENT CONTROLS



DTMF LEVEL -  
VR1 ON SIGNALING UNIT



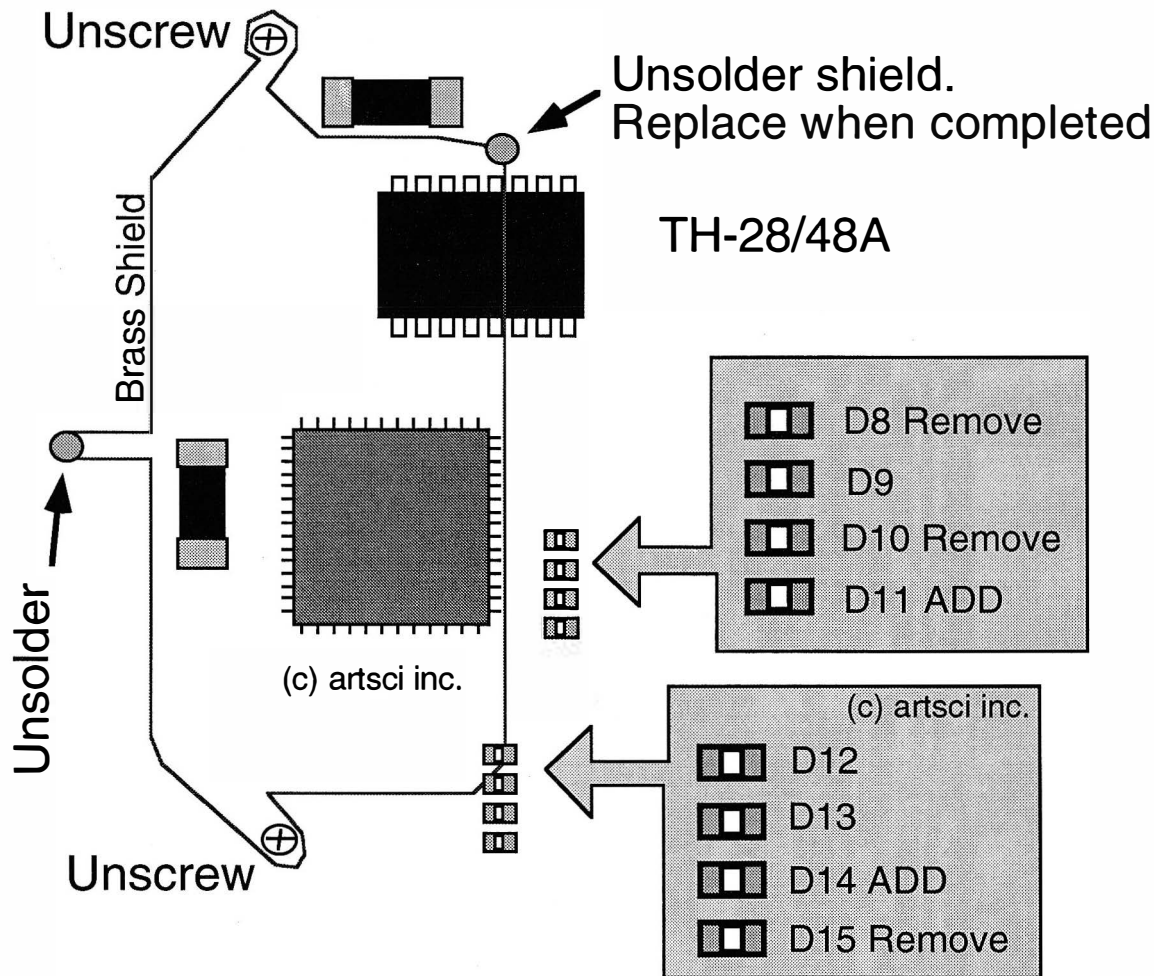
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

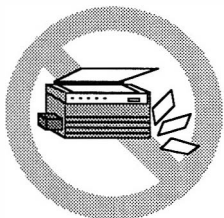
# KENWOOD TH-48A

## EXPANDED RF

1. Disconnect the Power and antenna.
2. Remove case screws and open the radio.
3. Locate Brass Shield.
4. Unsolder the two solder tack point on the shield.
5. Remove the two screws holding the shield.
6. Locate chip diode positions D8.....D15.
7. **Remove Diode D8, D10 & D15.** (save the diodes)
8. **Install Diodes D11 & D14.** (used diodes removed in the previous step)
9. Replace the brass shield. (replace the screws and the solder tack points.
10. Reassemble the radio.
11. **Reset the microprocessor.** (PRESS AND HOLD [F] AND TURN POWER ON)



MORE --

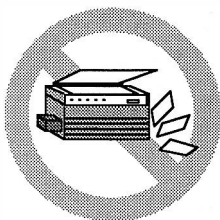
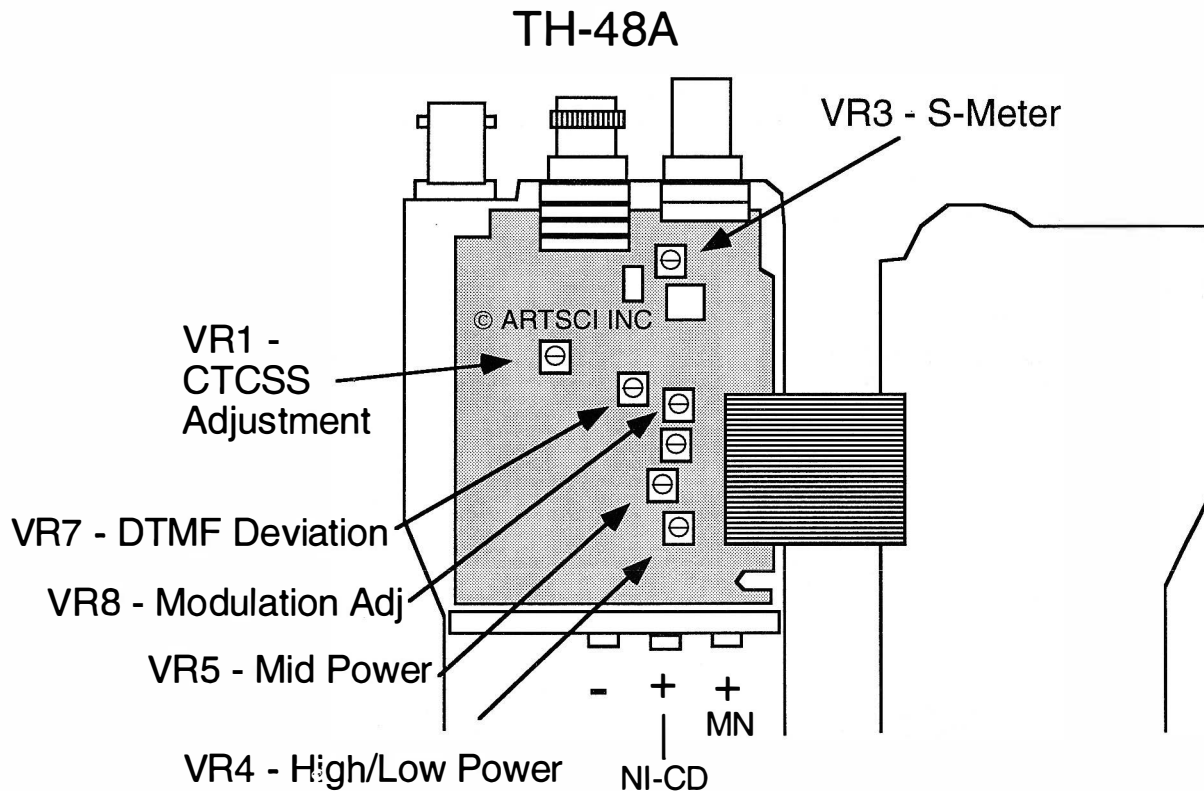


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-48A

## ALIGNMENT POINTS

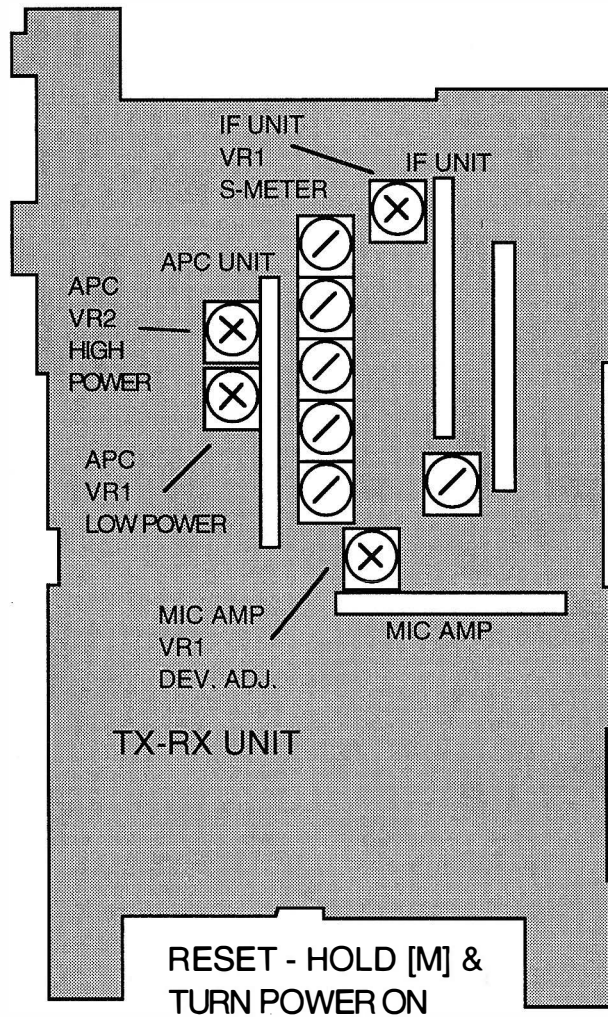


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

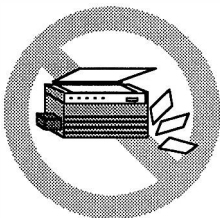
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-55A/AT

## ADJUSTMENT CONTROLS



DTMF LEVEL -  
VR1 ON SIGNALING UNIT



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

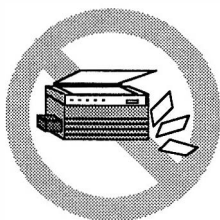
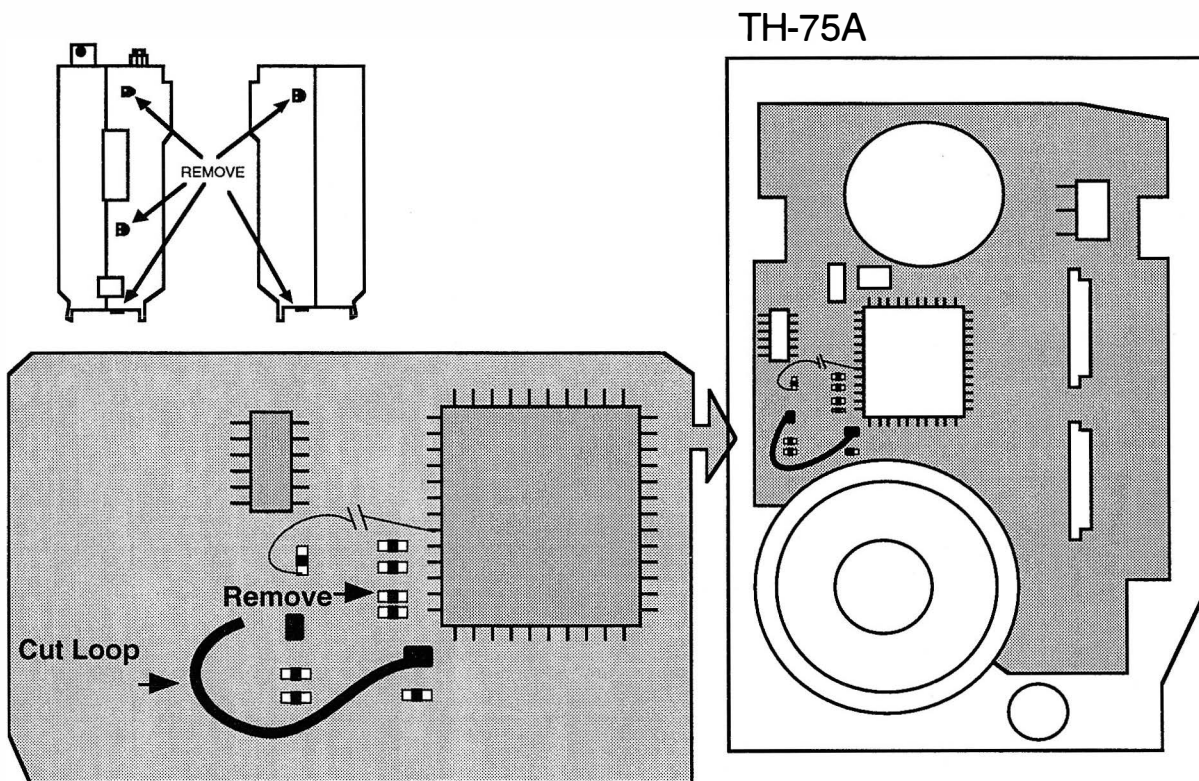
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TH-75A

## EXPANDED RF

- 1 Disconnect the battery and antenna.
2. Remove the three case screws and two battery plate screws.
3. Lift front panel from radio. Do not disconnect flex cables.
4. **Cut the GREEN JUMPER WIRE**, located on left side of the CPU.
5. Remove the diode. (see drawing)
6. Reassemble the radio.
7. **RESET the CPU.** (Press and hold the M Key while turning on the radio.)



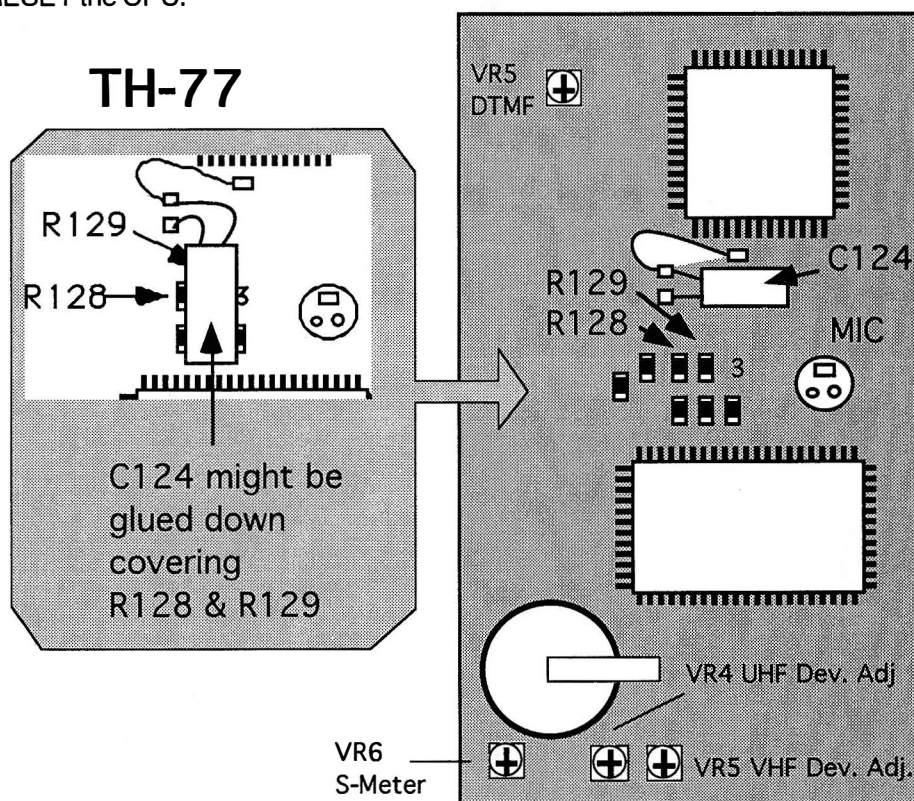
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TH-77A

### EXPANDED RF & CROSS BAND REPEATER AM RECEIVE ON 118-136 MHz

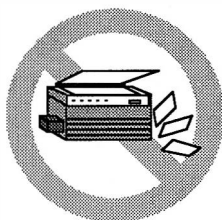
1. Disconnect the battery and antenna.
2. Remove the three case screws and two battery plate screws.
3. Lift front panel from radio. Do not disconnect flex cables.
4. **Remove chip resistor R128 and R129.** Capacitor C124 may be glued down over these Resistors. You may wish to unsolder the capacitor to avoid tearing the flex board foil traces.
5. Reassemble the radio.
6. RESET the CPU.



AM sensitivity is typically less than 1uV for 10db S+N/N.

#### CROSS BAND OPERATING PROCEDURES

**Turn on /off the Repeater mode :** Press and hold the [SUB UP] key and turn the power on.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-78A

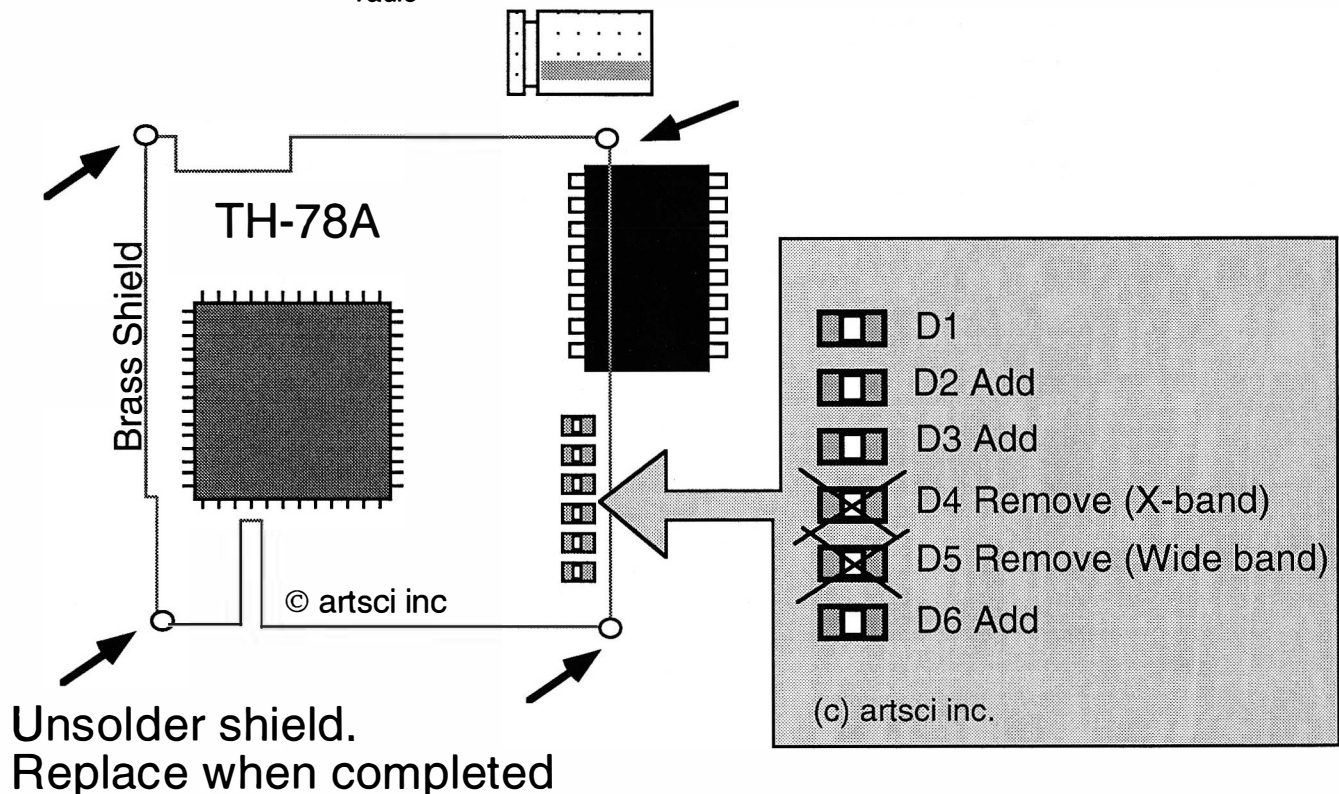
## EARLY MODEL - EXPANDED RF

1. Disconnect the battery and antenna.
2. Remove 4 screws (3 on back & 1 on left side) and open the case.
3. Locate and remove the Brass Shield. (4 solder points)
4. Locate Diode position D1.....D6. (part # MA110 or 1SS355)
5. **Install a chip diode in position D2, D3 & D6.** (Present in USA versions)
6. **Remove chip diode D5.** (Expanded RF)
7. **Remove chip diode D4.** (Cross band mod)
8. Resolder Brass Shield.
9. Reassemble the radio. (Be careful of the small O-rings sealing the two LED's)
10. **Reset the Microprocessor.** (see user manual).

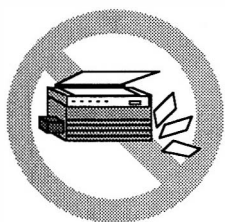
NOTE: TO SELECT 300 & 800 MHz. IN 440: PRESS [F] KEY FOR 2 SECONDS THEN [BAND].

TO TURN ON/OFF CROSS BAND REPEATER FUNCTION: PRESS [F] & [0].

TO CLONE RADIOS: Press & hold [F] [0] [Power] for 2 seconds. Press PTT on master radio



MORE ---



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

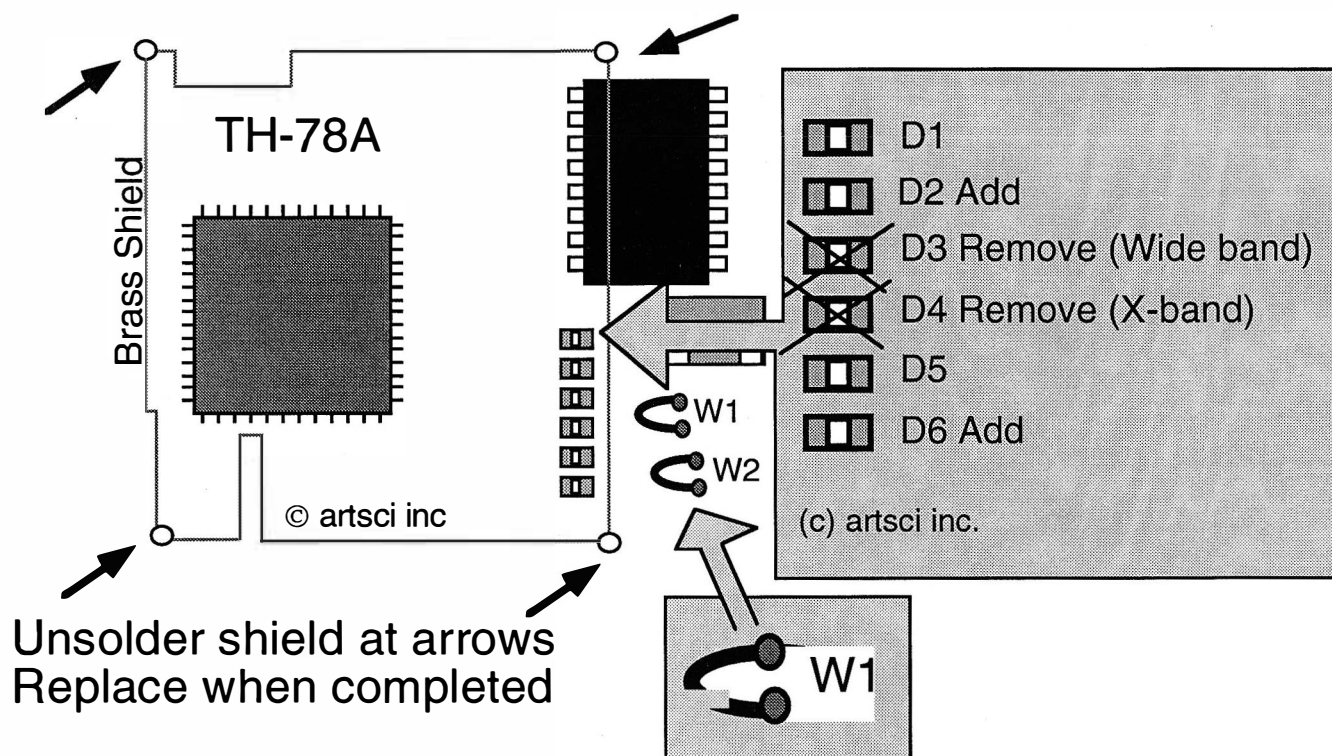
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-78A

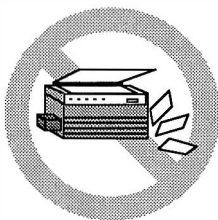
LATER MODEL( WITH GREEN JUMPERS) - EXPANDED RF  
136 - 174 MHz TX / 400 -490 MHz TX

1. Disconnect the battery and antenna.
2. Remove 4 screws (3 on back & 1 on left side) and open the case.
3. Locate and remove the Brass Shield. (4 solder points)
4. Locate Diode position D1.....D6.
5. **Locate and cut W1.**
6. **Remove chip diode D3.** (Expanded RF)
7. **Remove chip diode D4.** (Cross band mod)
8. Resolder Brass Shield.
9. Reassemble the radio. (Be careful of the small O-rings sealing the two LED's)
10. **Reset the Microprocessor.**  
(Press & hold [M] key & turn on, Hold [M] until LCD clears).

NOTE: TO SELECT 300 & 800 MHz. IN 440: PRESS [F] KEY FOR 2 SECONDS THEN [BAND].  
TO TURN ON/OFF CROSS BAND REPEATER FUNCTION: PRESS [F] & [0].  
TO CLONE RADIOS: Press & hold [F] [0] [Power] for 2 seconds. Press PTT on master radio



MORE ---

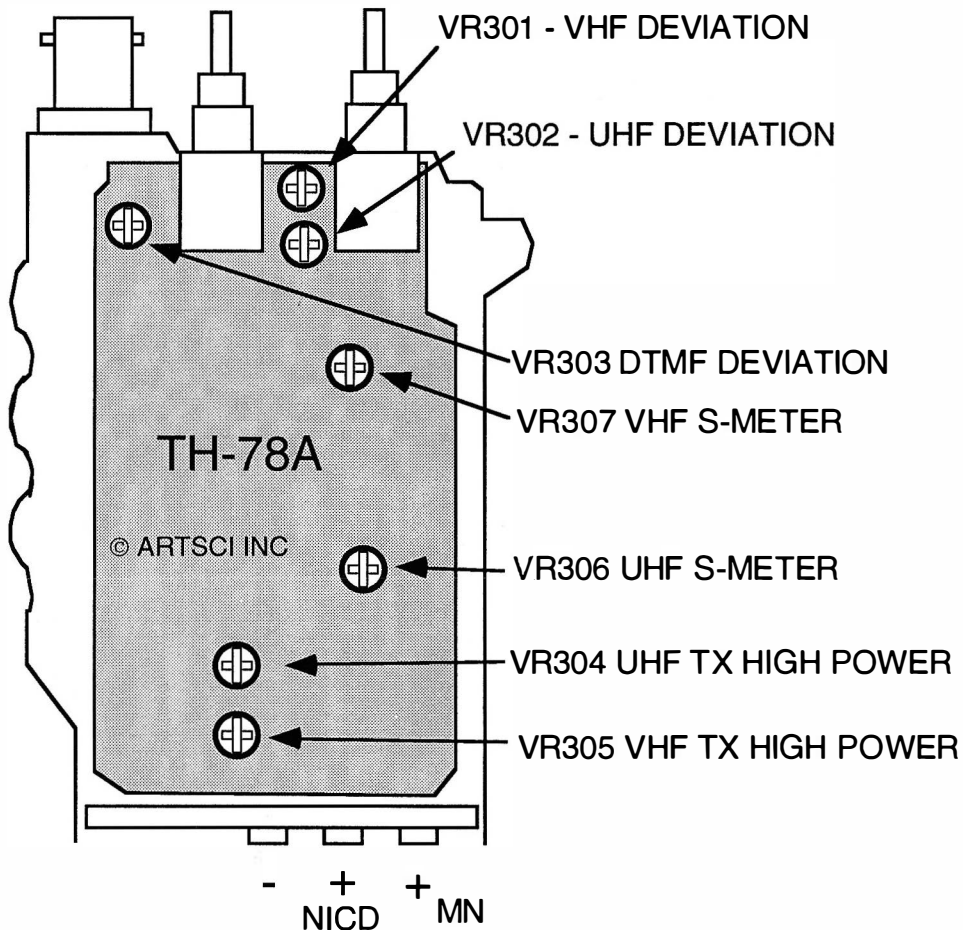


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

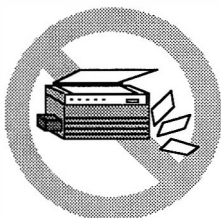
# KENWOOD TH-78A

## ALIGNMENT POINTS



SIMON GAME - PRESS [M] & PTT & TURN ON. DISPLAY WILL PROMPT "PRESS ANY KEY".

AFTER 20 SIMON POINT- BLACK JACK WILL START



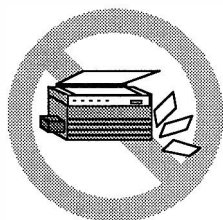
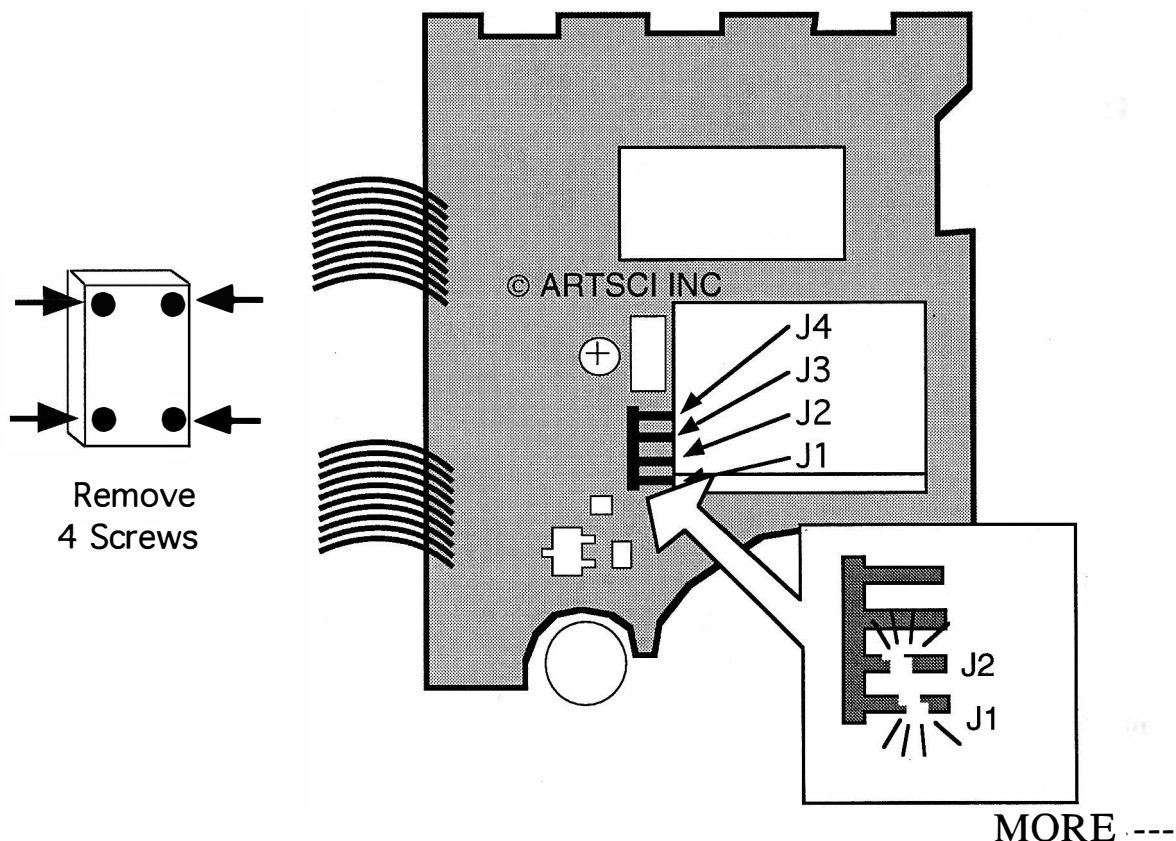
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TH-215

### EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the 4 screws from the back panel.
3. Carefully lift the front panel from the radio. Do not disconnect the flex cables.
4. **CUT Jumpers J1 and J2.**
5. Reassemble the radio.
6. **RESET the CPU.** (Press and hold [F] & [ENTER] and turn power on)

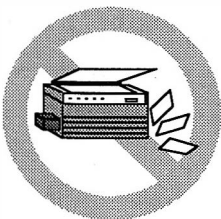
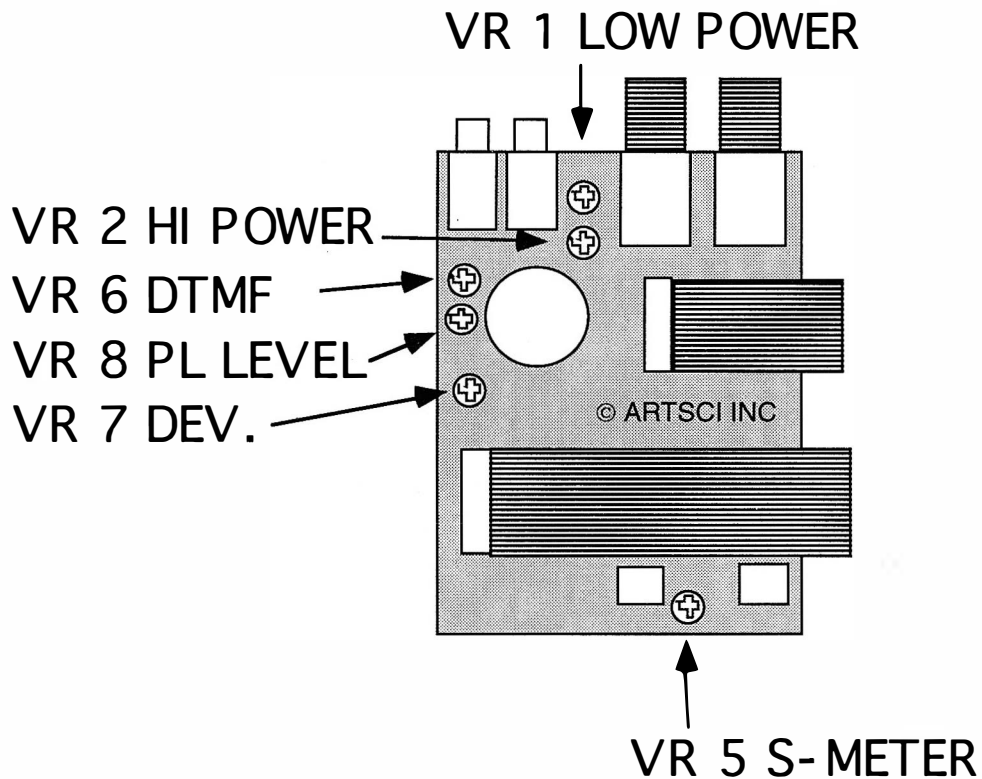


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TH-215

## ALIGNMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

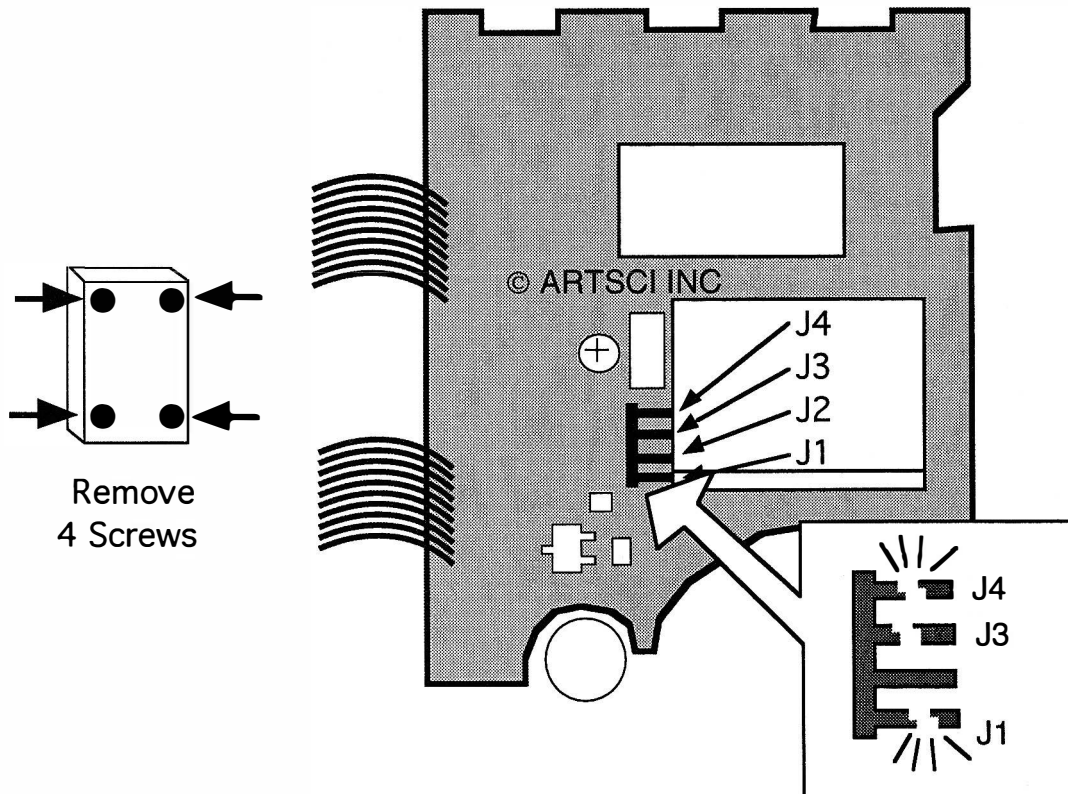
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## KENWOOD TH-315

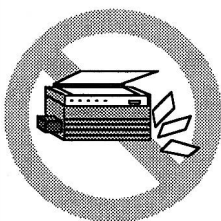
### EXTENDED RF

1. Remove battery and antenna.
2. Remove the screws holding the radio together.
3. Locate the Digital Circuit board (A02-076X-05)
4. **Cut Jumpers 1, 3 and 4**
5. Reassemble the radio.
6. **Reset the microprocessor.**(Press and hold [F] & [ENTER] and turn power on)



Range : 215.000 - 229.995 MHz

MORE ---



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

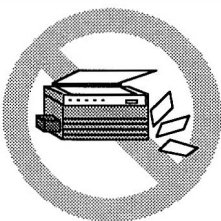
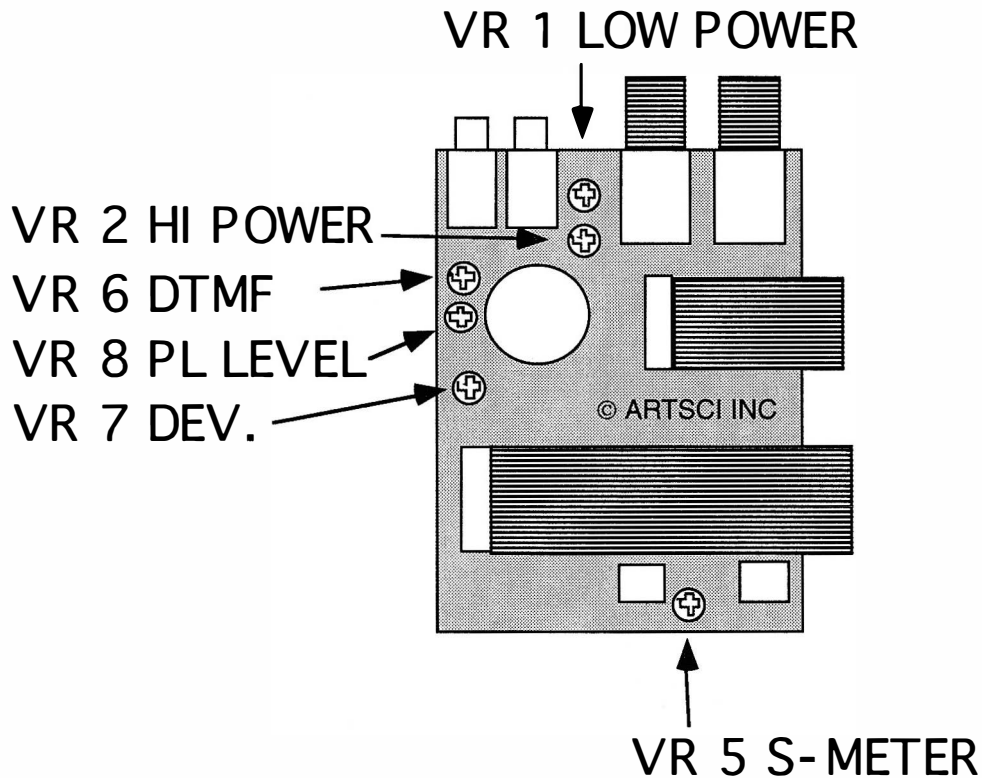
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TH-315

## ALIGNMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

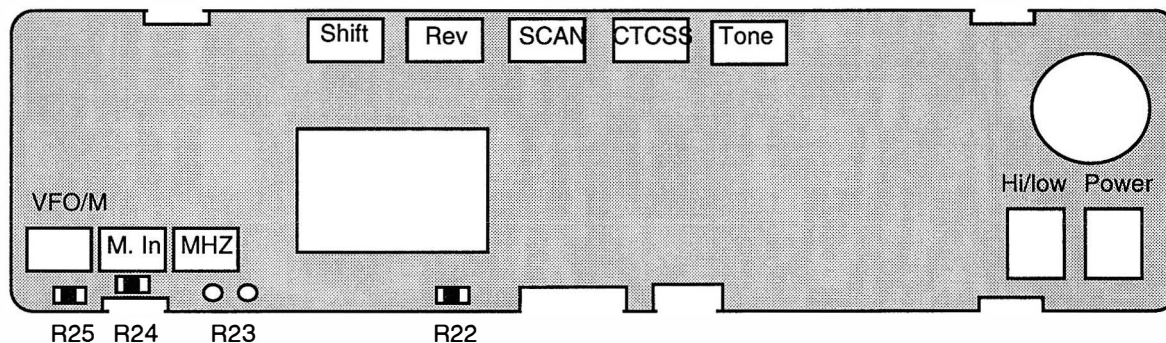
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-221

### EXPANDED RF M/C

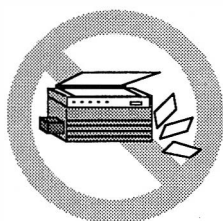
1. Disconnect the power and antenna.
2. Remove the top and bottom covers.
3. Locate the control unit (X53-3040-XX). It is the board closest to the front.
4. **Remove R25 and place it in the position of R24.**
5. Reassemble the radio.
6. **RESET the CPU.** (Press and hold [VFO/M] & [M.IN] and turn power on)

### TM-X21



TX Range 142 MHz - 154 MHz

MORE ---

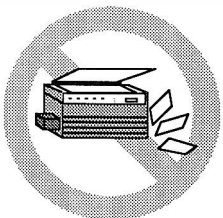
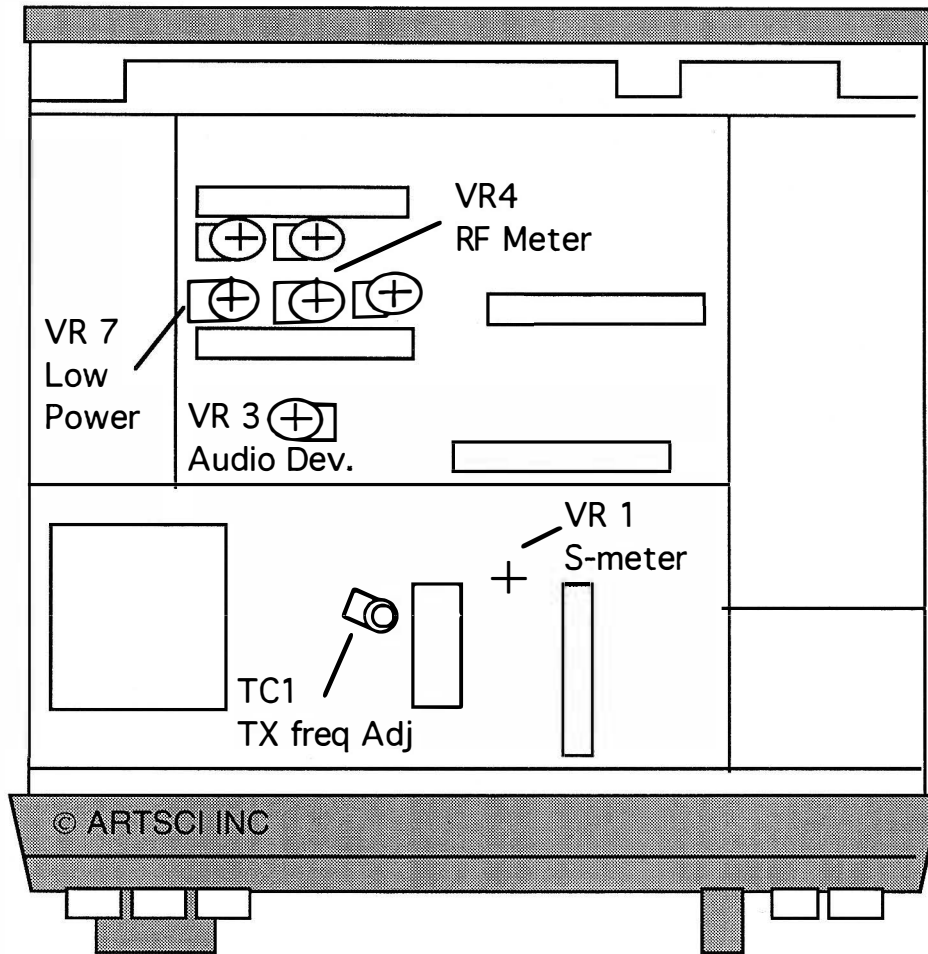


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-221

## ALIGNMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

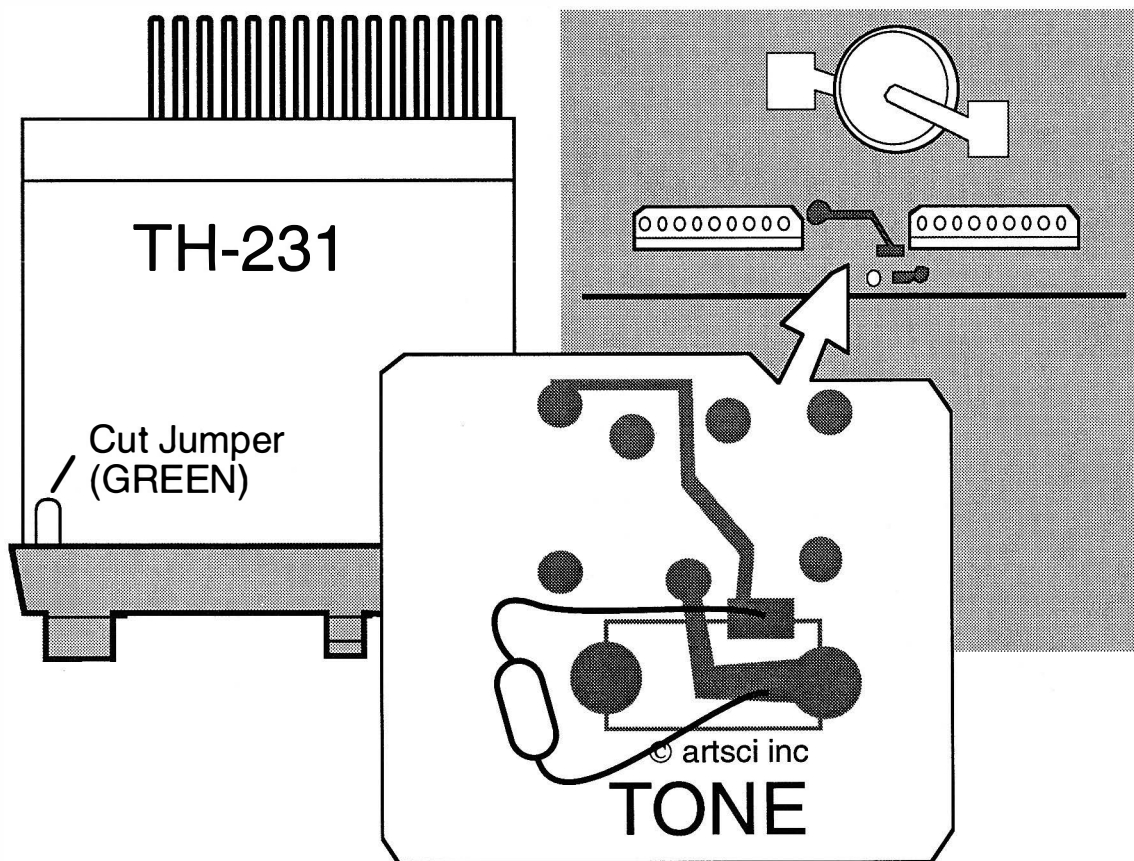
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

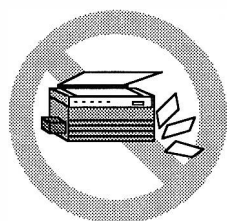
# KENWOOD TM-231A

## EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from the front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire sticking out the front panel, behind the VFO button
8. **Cut the green jumper** and tape the edges to prevent them from shorting.
9. **Install diode D209** Part # MA141A on control board X57-3310-11.
10. Reassemble the radio
11. **Reset the microprocessor.** (Press and hold [MR] while turning on the power)



MORE ---

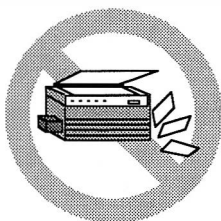
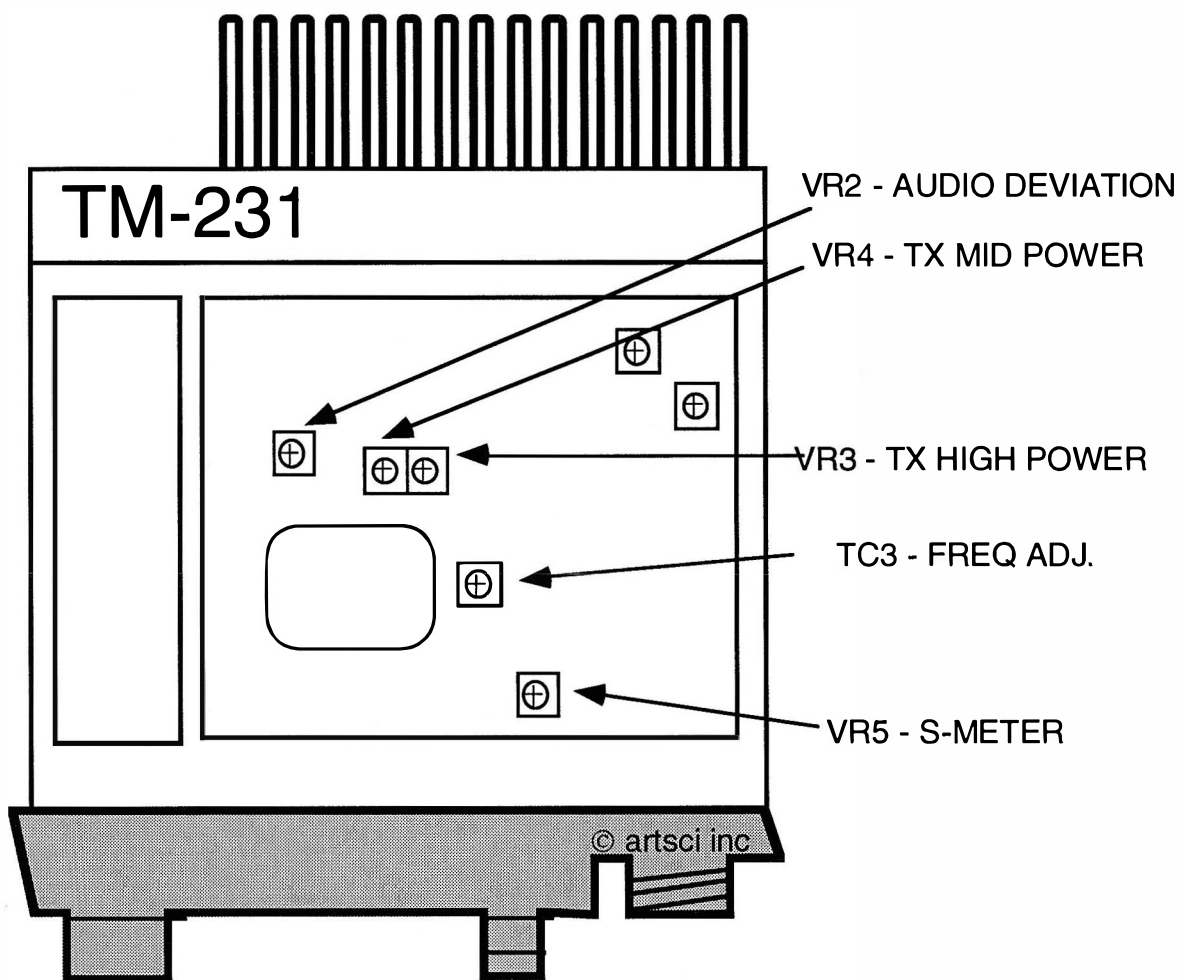


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-231A

## ALIGNMENT CONTROLS



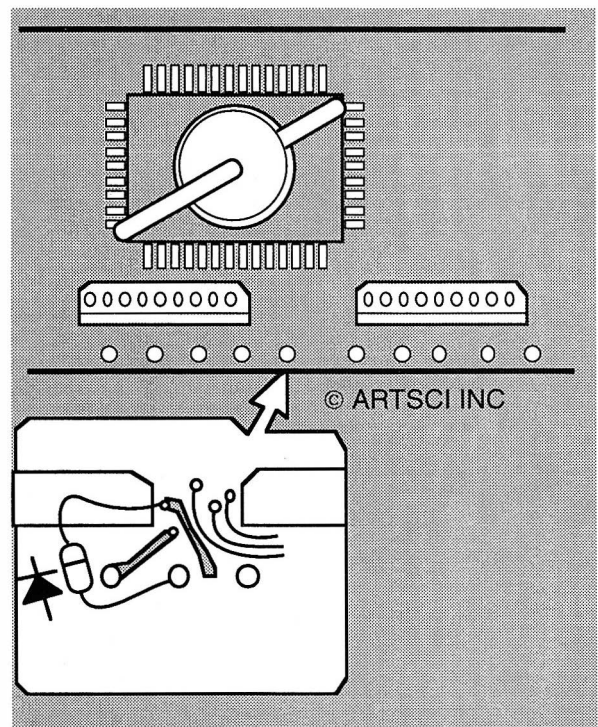
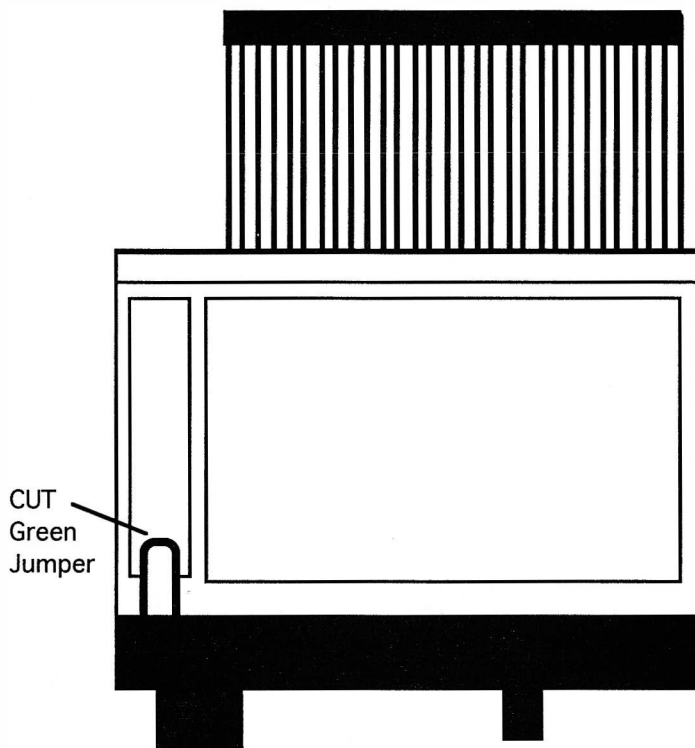
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

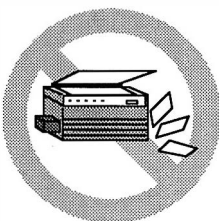
## KENWOOD TM-241A

EXPANDED RF M/C  
138 - 152 MHz RX/TX

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from the front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire on the control board.
8. **Cut the green jumper** and tape the edges to prevent them from shorting.
9. **Install chip diode D209** on control board Part # MA141A  
The control board is located on the front panel (Control knobs must be removed.)
10. Reassemble the radio
11. **Reset the microprocessor** (Press and hold [MR] while turning on the power)



MORE ---

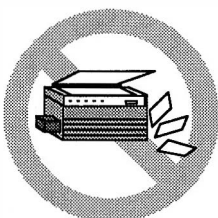
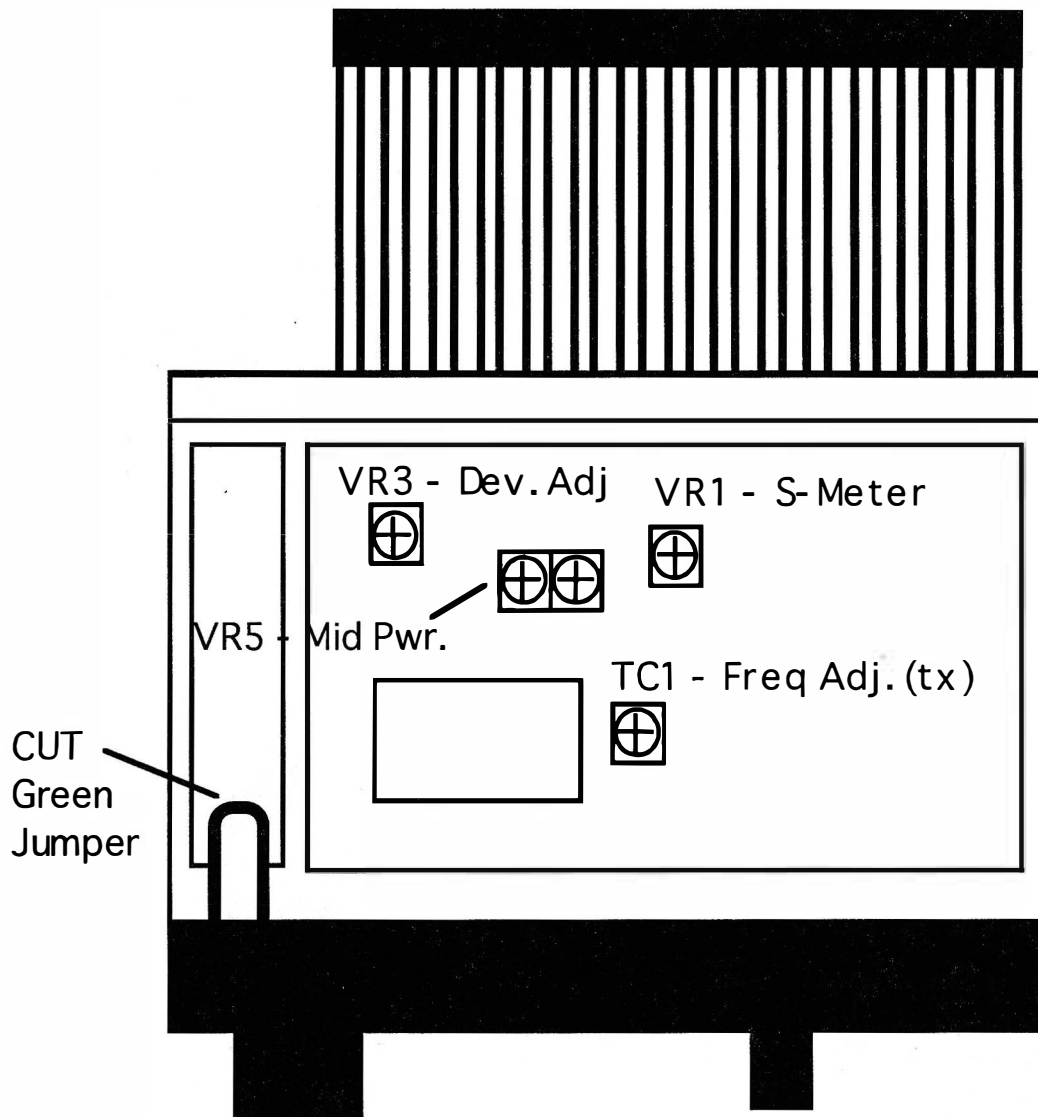


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-241A

## ALIGNMENT CONTROLS

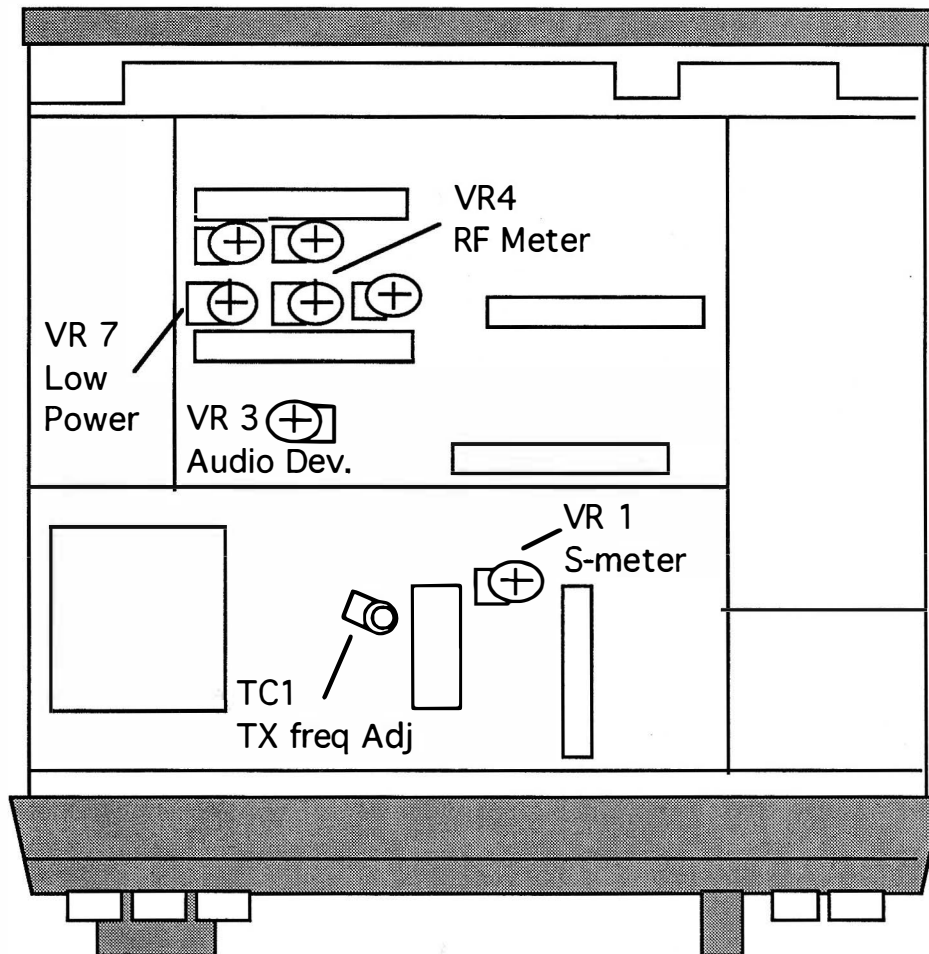


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-321A

## ADJUSTMENT CONTROLS



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

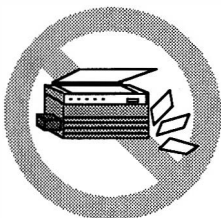
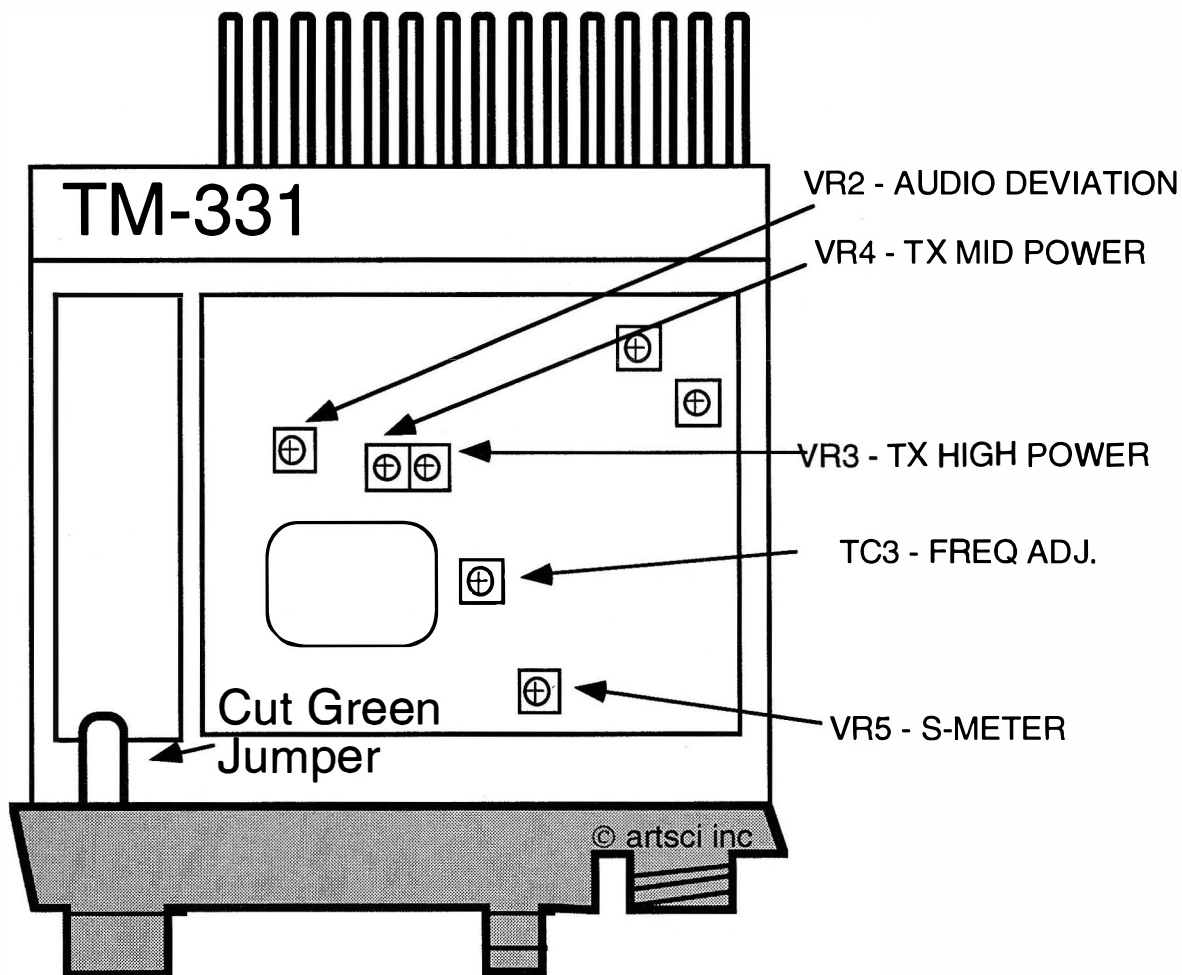
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TM-331A

## EXTENDED RF / ALIGNMENT CONTROLS NEW TX/RX RANGE (215 - 229 MHz)

1. Remove power and antenna.
2. Remove top cover.
3. **Locate and cut Green jumper.**
4. Reassemble the radio.
5. **Reset the Microprocessor.** (Hold [MR] and turn power on)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

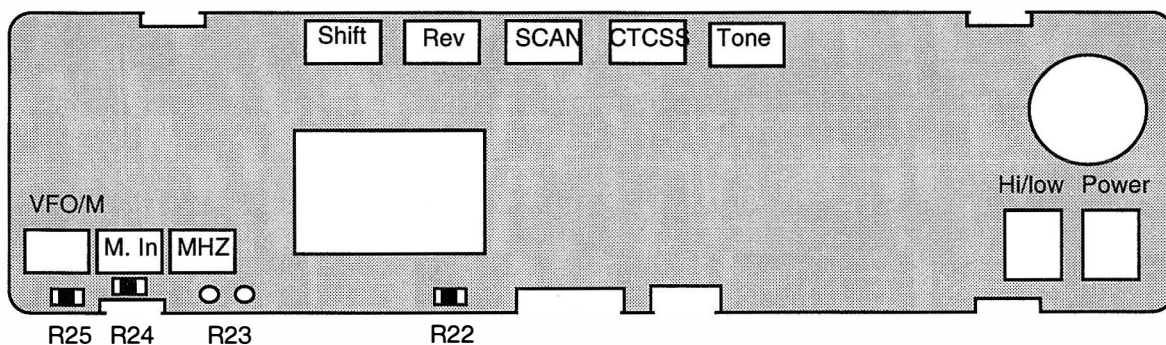
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-421A

### EXTENDED RF

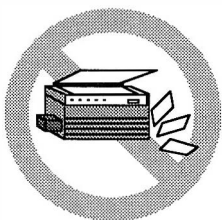
1. Remove power and antenna.
2. Remove the top and bottom covers
3. Remove the channel knob
4. Remove the microphone ring.
5. Remove the volume and squelch knobs
6. Remove the front panel from the unit.
7. Remove the front control unit from the chassis.
8. Locate component side of the Control unit circuit board.
9. Locate chip Resistor R-25.
10. **Remove R-25 and place it in the empty position R-23.**
11. **Remove R-22.**
12. Reassemble the radio.
13. **Reset the microprocessor.**(Press and hold [MR] while turning on the power)

### TM-X21



RESET : Press and hold [VFO/M] and [M.IN] and turn power on.

MORE ---

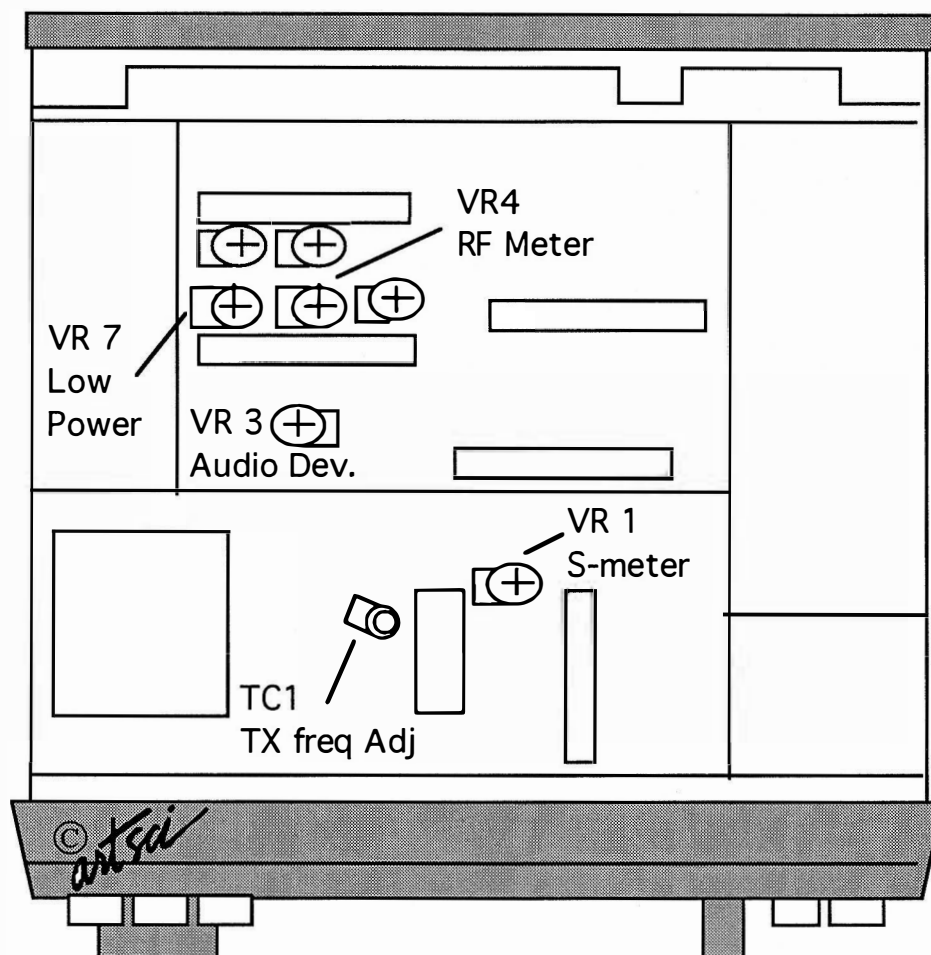


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-421A

## ALIGNMENT CONTROLS



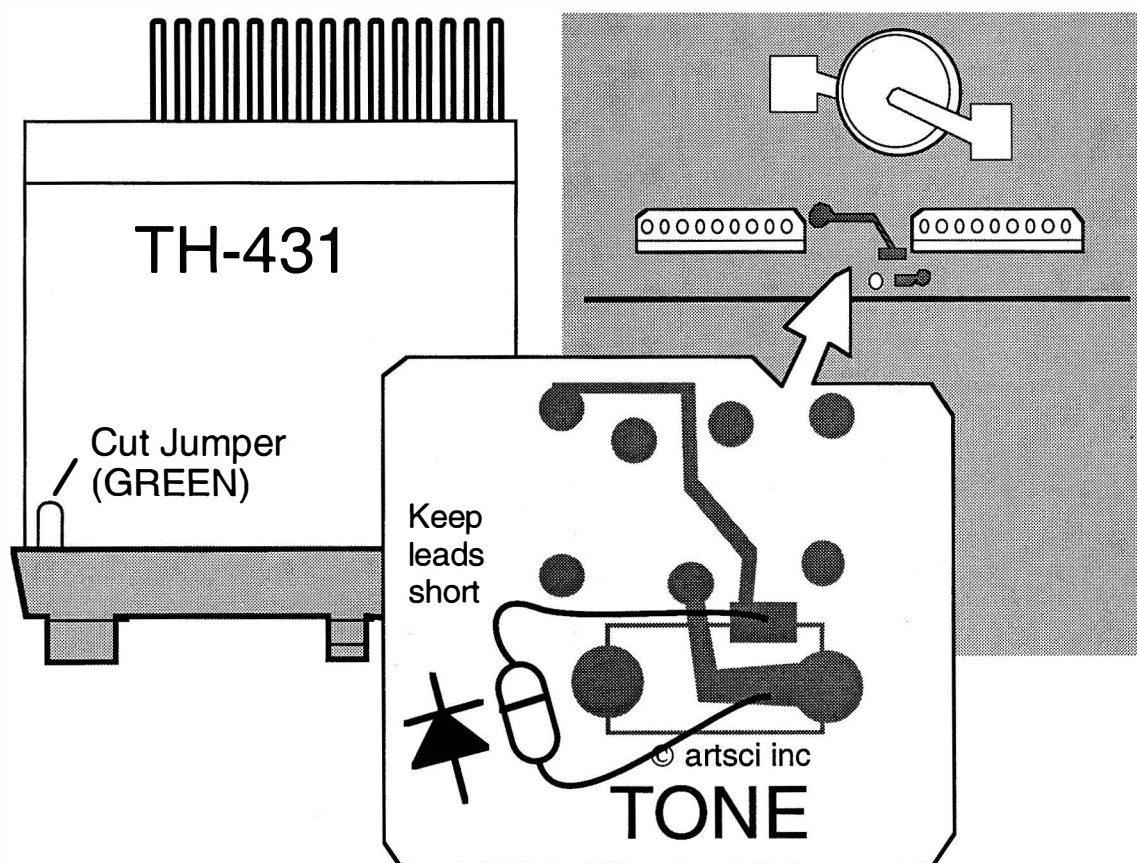
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

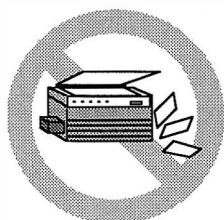
# KENWOOD TM-431A

## EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire sticking out the front panel, behind the VFO Button.
8. **Cut the green jumper** and tape the edges to prevent them from shorting.
9. **Install diode D209** Part # MA141A on control board or use a 1N914 as shown.
10. Reassemble the radio
11. **Reset the microprocessor.** (Press and hold [MR] while turning on the power)



MORE ---

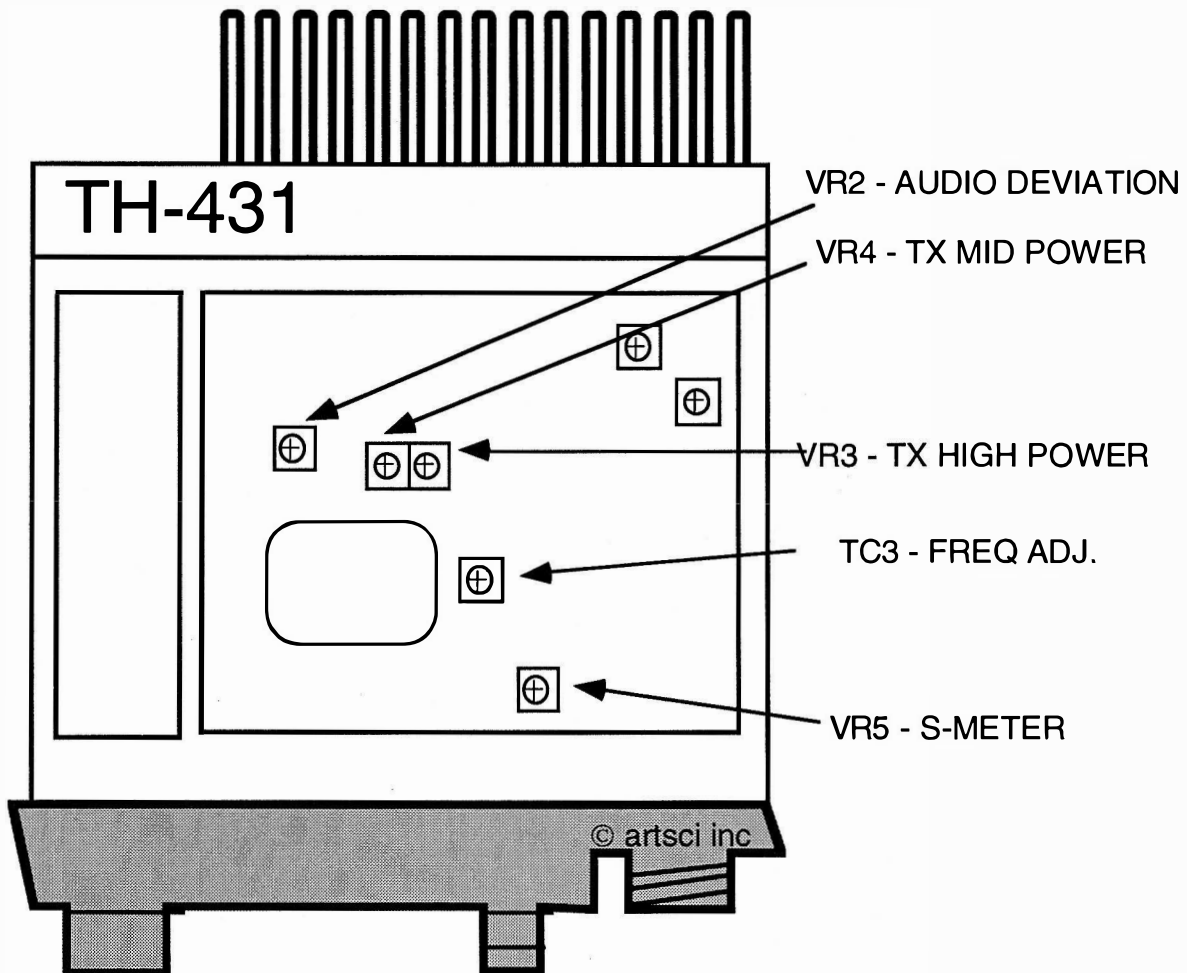


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-431A

## ALIGNMENT CONTROLS



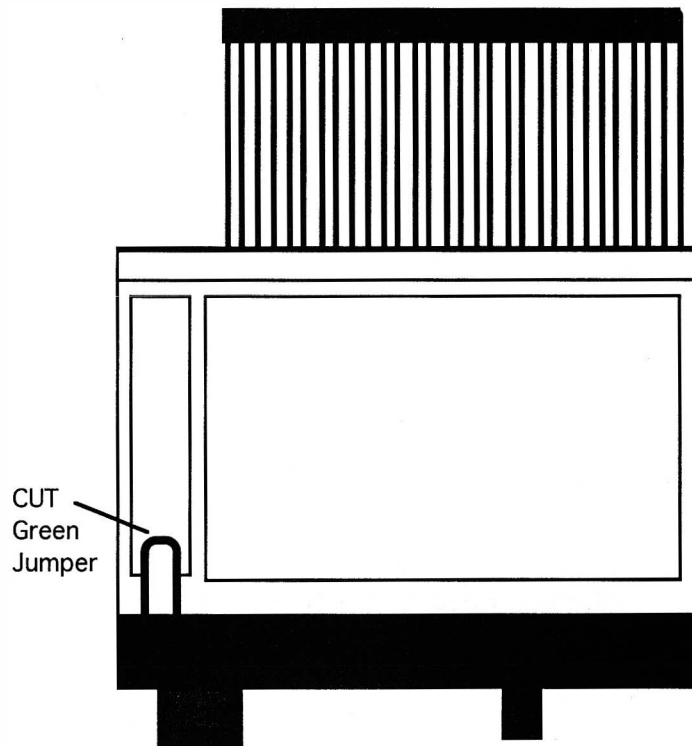
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

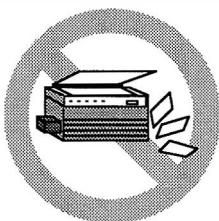
## KENWOOD TM-441A

### EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire on the control board.
8. **Cut the green jumper** and tape the edges to prevent them from shorting.
9. Reassemble the radio
10. **Reset the microprocessor.** (Press and hold [MR] while turning on the power)



MORE ---

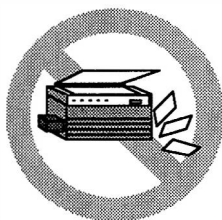
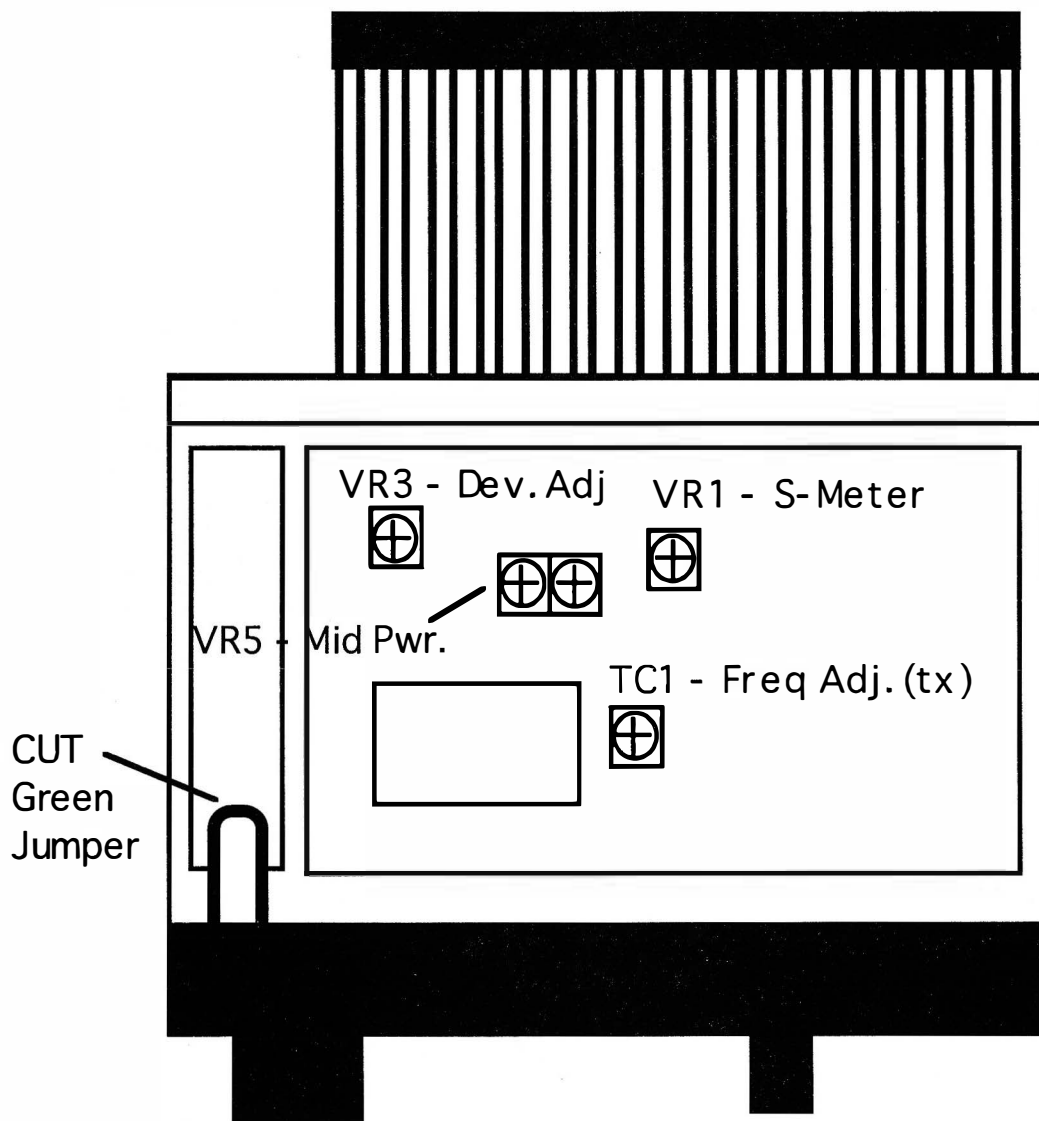


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-441A

## ALIGNMENT CONTROLS



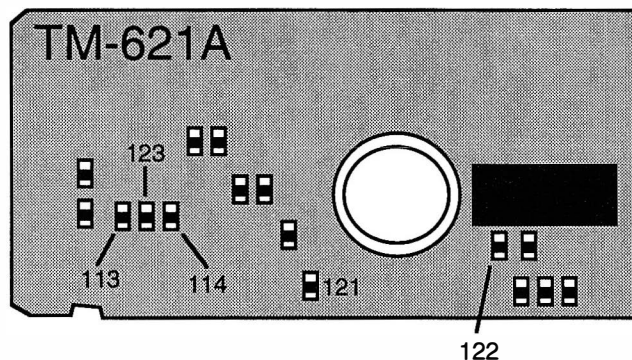
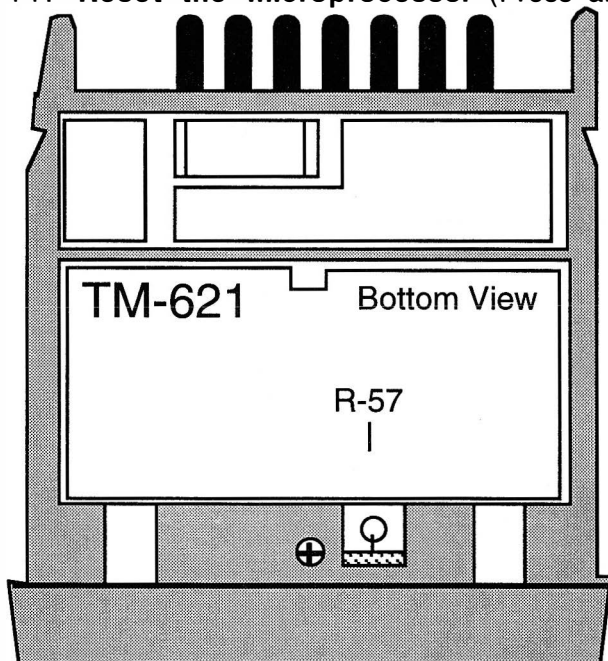
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-621A

### EXPANDED RF / CROSS BAND REPEATER

1. Disconnect the power and antenna.
2. Remove the top and bottom covers.
3. Locate and cut R57 on Control board. (Bottom side of radio)
4. Remove the silver colored screws from the front panel.
5. Carefully pull the front panel away from the body of the transceiver.
6. Locate chip resistor R113 and R114 on the Control board. (inside front panel)
7. **Remove the chip resistor** located between R113 & R114. It is labeled R123.
8. **Remove chip resistor R121** (cross band repeater mod)
9. **Remove R122** (disable 3 minute time out timer).
10. Reassemble radio.
11. **Reset the microprocessor** (Press and hold [F] while turning power on).

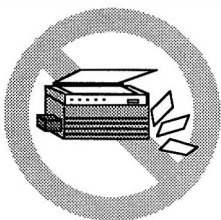


### CROSS BAND OPERATING PROCEDURES

The TM-621 will receive a signal on one band and will automatically re-transmit it on the other band. Each band can contain shift information.

**Turn on / off the Repeater mode :** Press F and then press A.B.C. Key. Three dots should appear in the display when the mode is on.

**MORE ---**



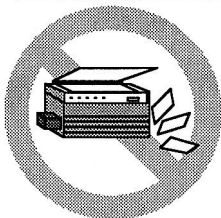
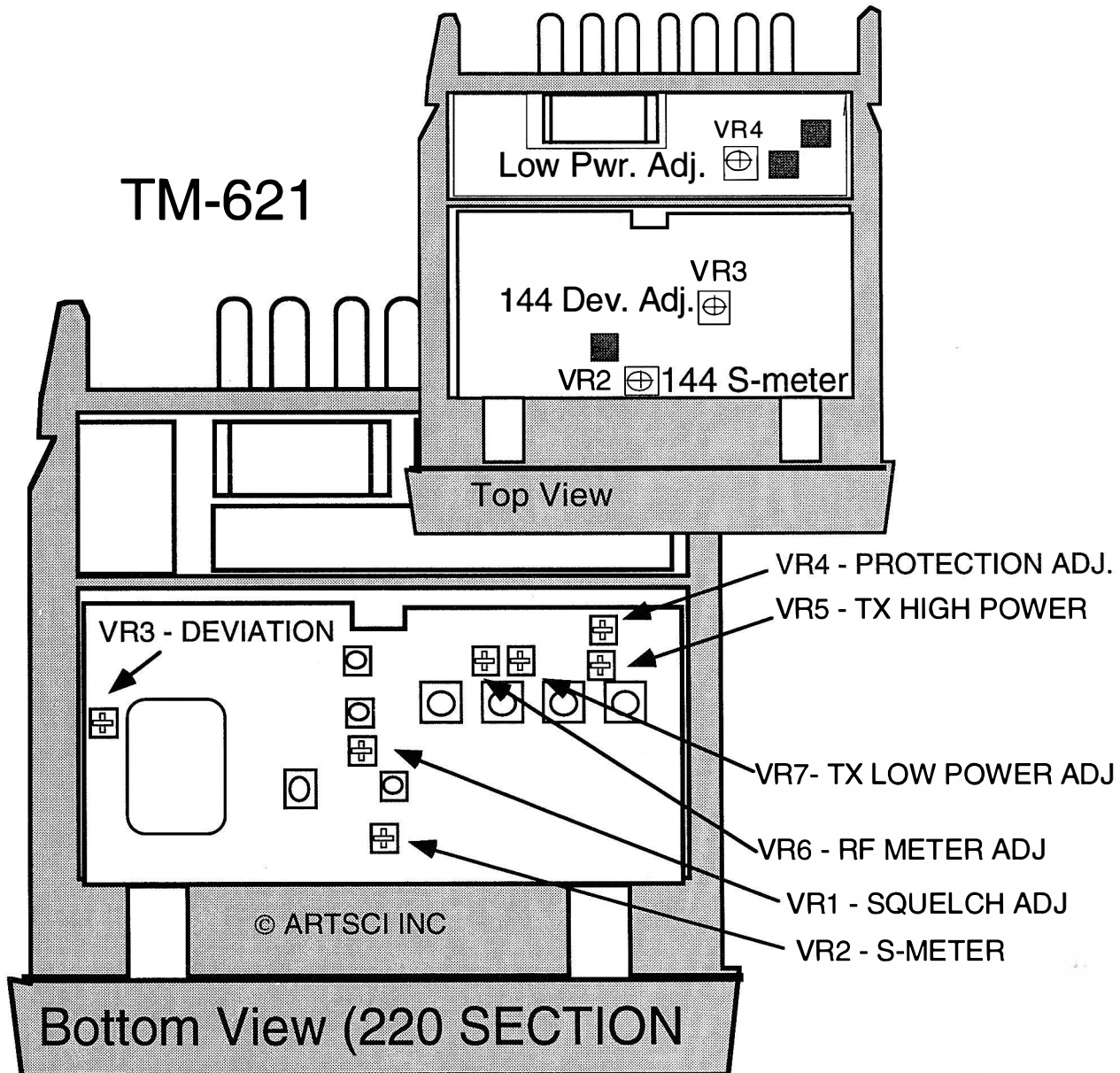
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TM-621A

## ALIGNMENT CONTROLS



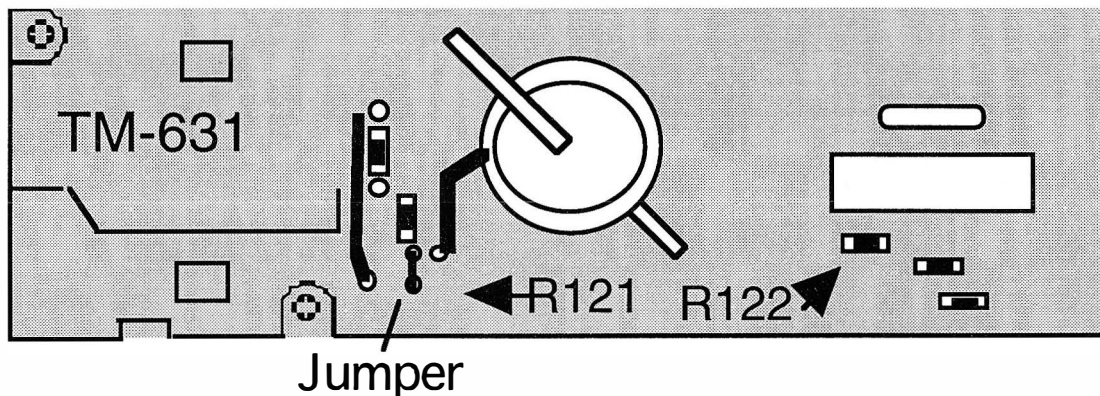
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD      TM-631

### EXPANDED RF/ CROSS BAND REPEATER/ TIME OUT TIMER

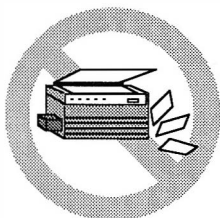
1. Remove power and antenna and the top and bottom covers.
2. CUT RESISTOR R25. R25 is located on the Control unit on the bottom side of the Radio. The resistor can be seen by looking through the cutout of the chassis just behind the front panel.
3. Remove silver color screws from the front chassis. The screws are located 2 on each side, 1 on the top and 1 on the bottom.
4. Pull the front panel away from the radio. Do not unplug any cables.
5. **Install a jumper wire** see diagram 1. (Some models this will not work properly)
6. **Remove R121.** (This is the Cross band repeater mod.)
7. **Remove R122.** (This will override the automatic 3 minute time out timer)
8. Reassemble the radio.
9. **Reset the microprocessor twice.** Press and hold the [MR] key and turn radio on.



**CROSS BAND OPERATING PROCEDURES:** The TM-631 will receive a signal on one band and will automatically re-transmit it on the other band. Each band can contain shift information. Only one band may contain PL encode/decode information. Do not turn Tone and CTCSS on in one band.

**Turn on / off the Repeater mode :** Press [F] and then press [A.B.C.] Key.  
Three dots should appear in the display when the mode is on.

MORE ---

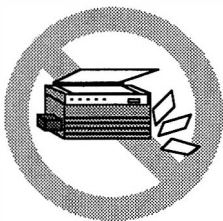
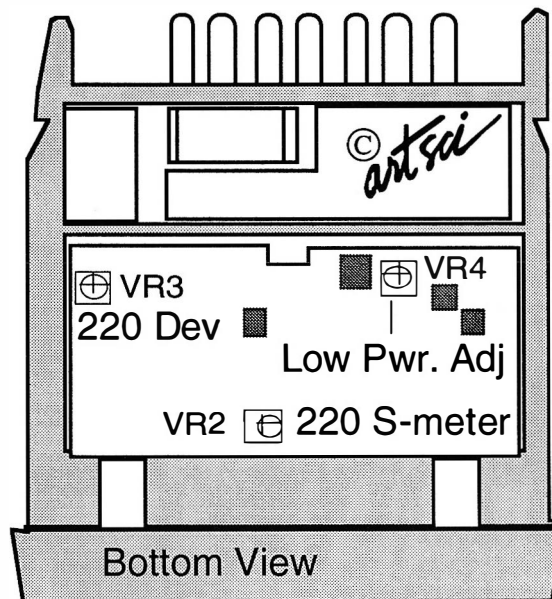
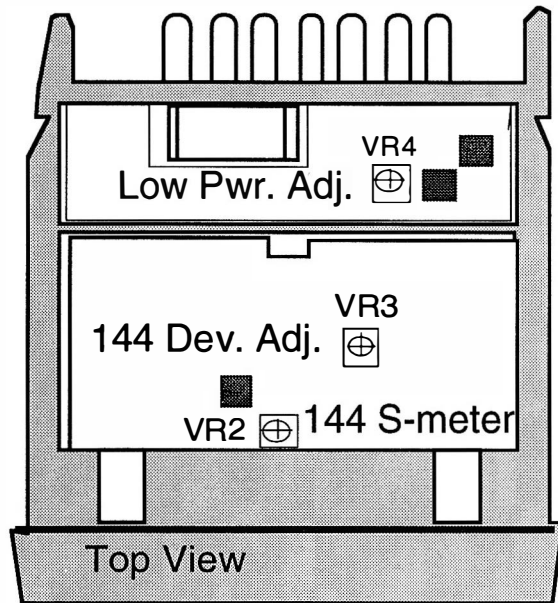


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-631

## ALIGNMENT POINTS



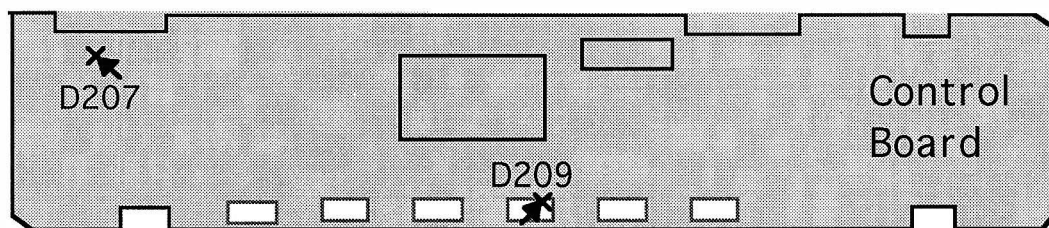
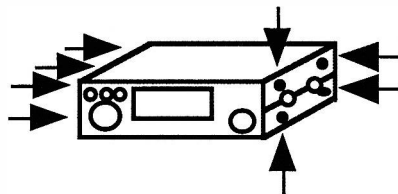
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-701A

### EXPANDED RF / CROSS BAND REPEATER

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove knobs from front panel and the nuts from the mic and channel switch.
4. Remove 4 screws holding the front panel and the 3 screws on the control board.
5. Locate the green jumper wire sticking out the front panel, behind the VFO button.
6. **Cut the green jumper** and tape the edges to prevent them from shorting.
7. Optional: Install diodes D207 & D209 on control board X57-3350-00.
8. Solder a jumper to the foil side of the TX-RX board as shown in drawing.
9. Reassemble the radio.
10. **Reset the microprocessor** (Press and hold [MR] while turning on the power).

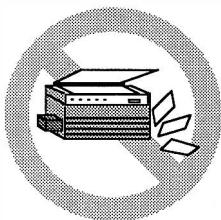


### CROSS BAND OPERATING PROCEDURES

**Turn on the Repeater mode :** Press and hold [F] and then press [DUP]. Then Press [F] longer than 1 Second. The F indicator will blink. Press [LOW]. Three dots should appear in the display when the mode is on.

**Turn off :** Press [VFO].

MORE ---

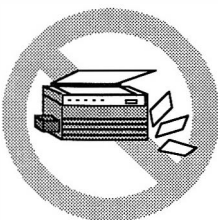
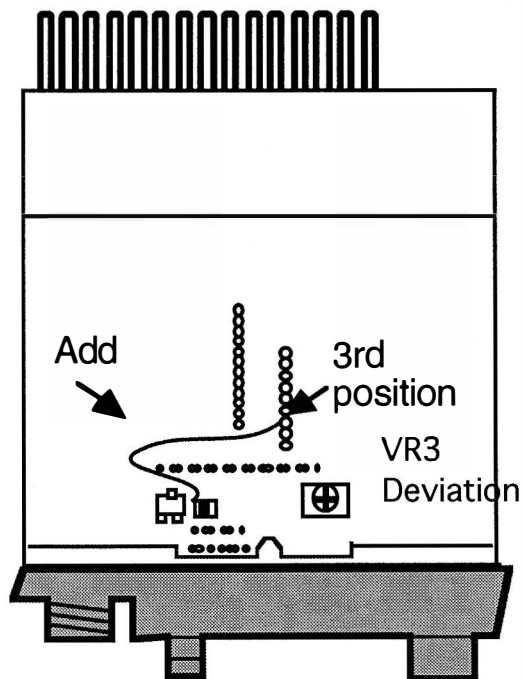
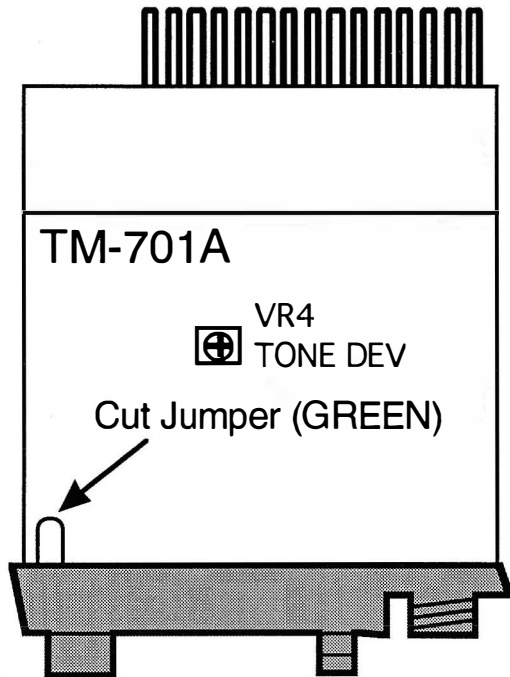


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-701A

## ALIGNMENT POINTS



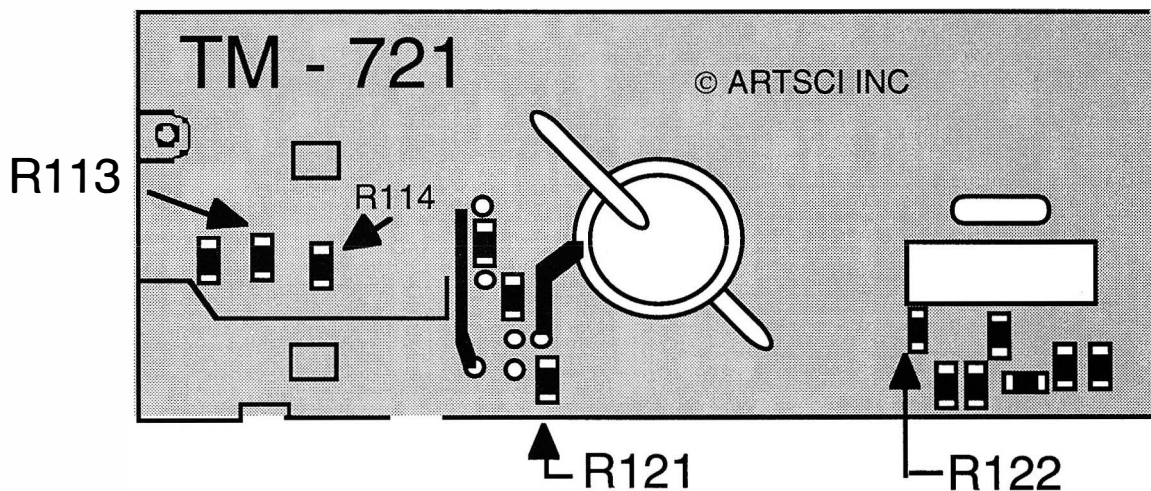
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-721

### EXPANDED RF/ CROSS BAND REPEATER

1. Remove power, antenna and the top and bottom covers.
2. Remove the six silver screws holding the front panel to the chassis.
3. Locate R113 and R114
4. **Solder a jumper** between the open pads between R113 & R114
5. **Remove R121.** (This is the cross band repeater mod.)
6. **Remove R122.** (This will override the automatic 3 minute time out timer)
7. **Cut R57** from the back of the board. Do not cut R58
8. Reassemble the radio
9. **Reset the microprocessor twice.** Press and hold the MR key and turn the power switch. Do this twice.

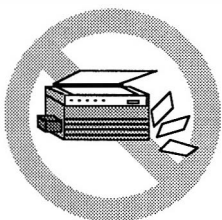


### CROSS BAND OPERATING PROCEDURES

The TM-721 will receive a signal on one band and will automatically re-transmit it on the other band. Each band can contain shift information. Only one band may contain PL encode/decode information. Do not turn tone and CTCSS on in one band.

**Turn on / off the Repeater mode :** Press F and then press A.B.C. Key. Three dots should appear in the display when the mode is on.

**MORE ---**

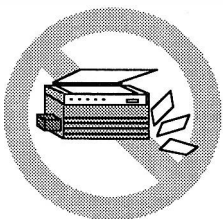
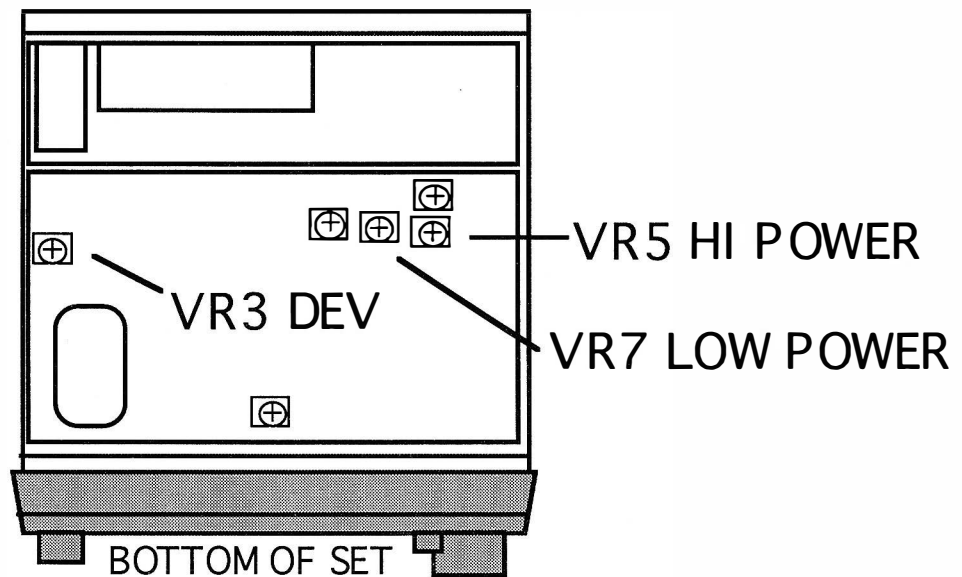
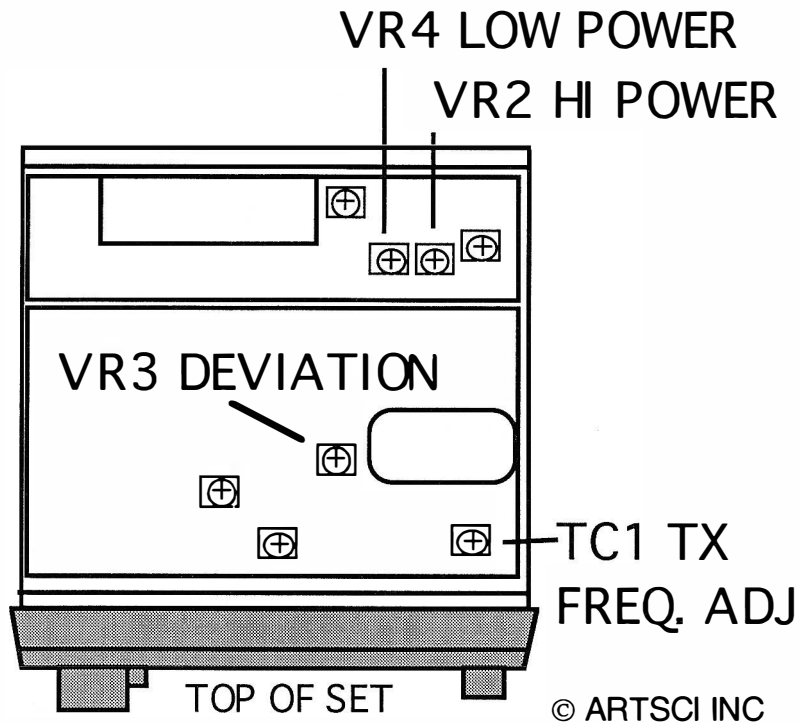


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-721

## ALIGNMENT CONTROLS



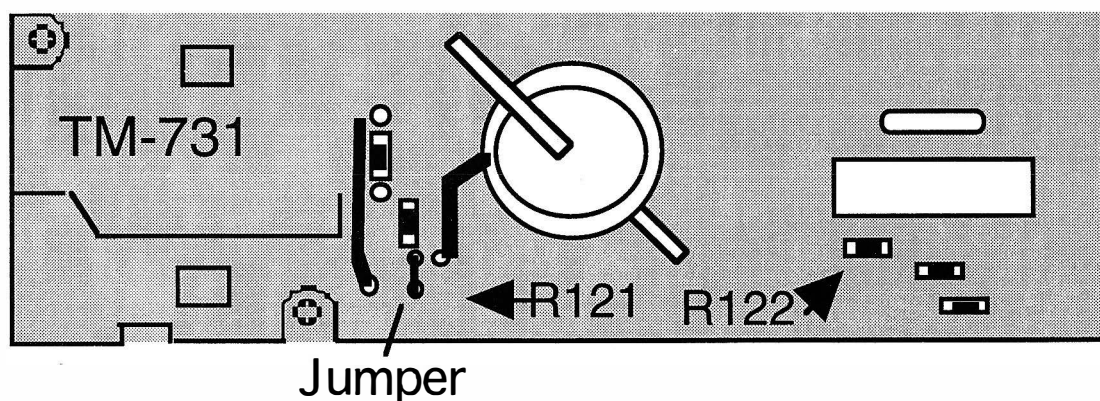
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-731

### EXPANDED RF/ CROSS BAND REPEATER/ TIME OUT TIMER

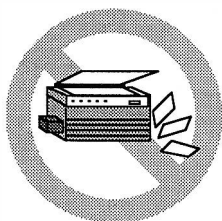
1. Remove power and antenna and the top and bottom covers.
2. **CUT RESISTOR R25.** R25 is located on the Control unit on the bottom side of the Radio. The resistor can be seen by looking through the cutout of the chassis just behind the front panel.
3. Remove silver color screws from the front chassis. The screws are located 2 on each side, 1 on the top and 1 on the bottom.
4. Pull the front panel away from the radio. Do not unplug any cables.
5. **Install a jumper wire** as shown in diagram 1.
6. **Remove R121.** (This is the Cross band repeater mod.)
7. **Remove R122.** (This will override the automatic 3 minute time out timer)
8. Reassemble the radio.
9. **Reset the microprocessor twice.** Press and hold the [MR] key and turn radio on.



**CROSS BAND OPERATING PROCEDURES:** The TM-731 will receive a signal on one band and will automatically re-transmit it on the other band. Each band can contain shift information. Only one band may contain PL encode/decode information. Do not turn Tone and CTCSS on in one band.

**Turn on / off the Repeater mode :** Press [F] and then press [A.B.C.] Key. Three dots should appear in the display when the mode is on.

**MORE ---**



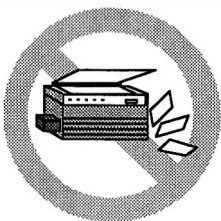
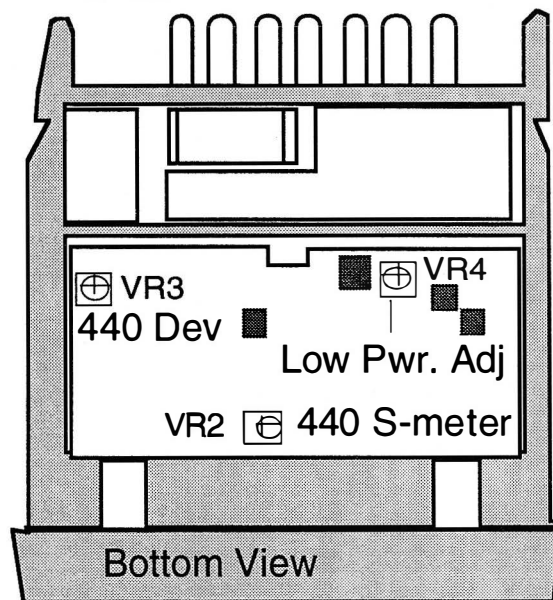
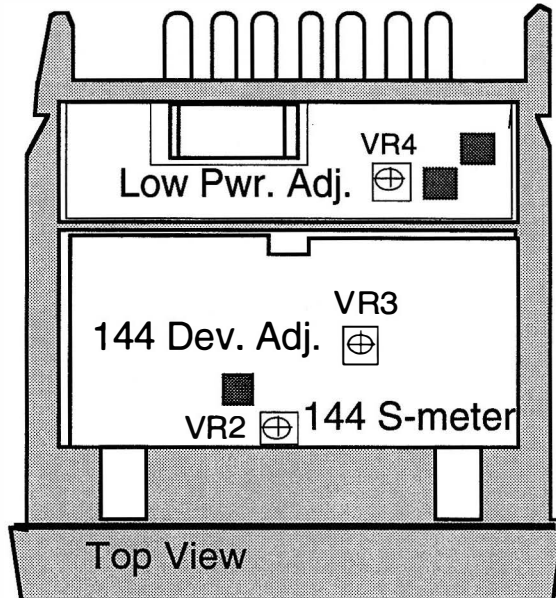
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TM-731

## ALIGNMENT POINTS



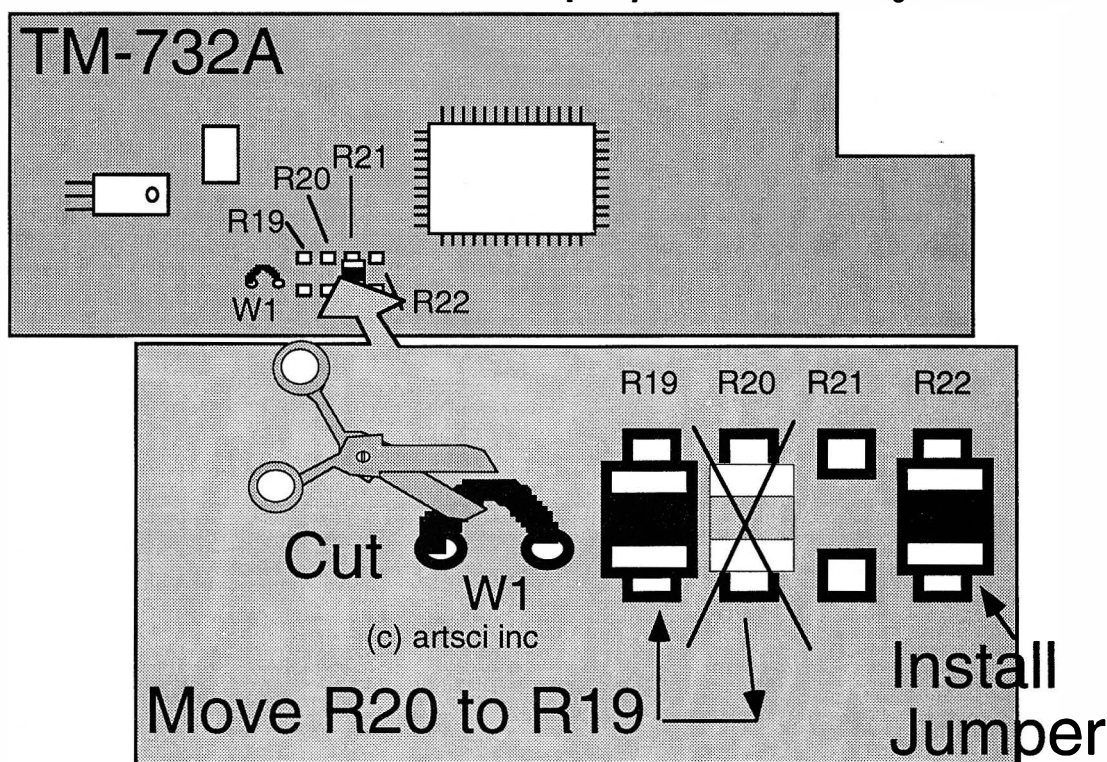
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

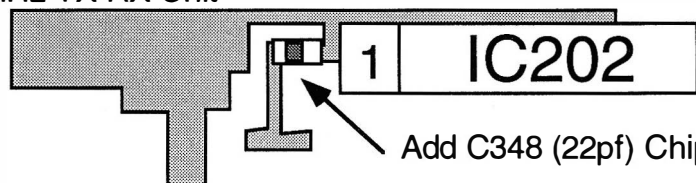
## KENWOOD TM-732A EXPANDED RF

1. Remove power, antenna and the top and bottom covers.
2. Remove front display and expose circuit board.
3. **Clip Jumper W1.** (Expanded RX and 800 MHz) This may cause some problems in later models of the radio. **YOU MAY NOT NEED THIS STEP.**
4. **Remove Resistor R20 & R21** if present.
5. **Place a jumper in position R19 & R22.** (R22 not required in some models)
6. **Add a 22pf chip cap** in position C348 on the 440 TX-RX board. (800 MHz RX mod)
6. Reassemble the radio.
7. **Reset the microprocessor.** ( Press [MR] & turn then press [VFO] & turn on)

800 MHz      Enable/Disable:      Press [MHz] in 440 VFO for longer than 1 second.



430 MHz TX-RX Unit



800 MHz RX

MORE --

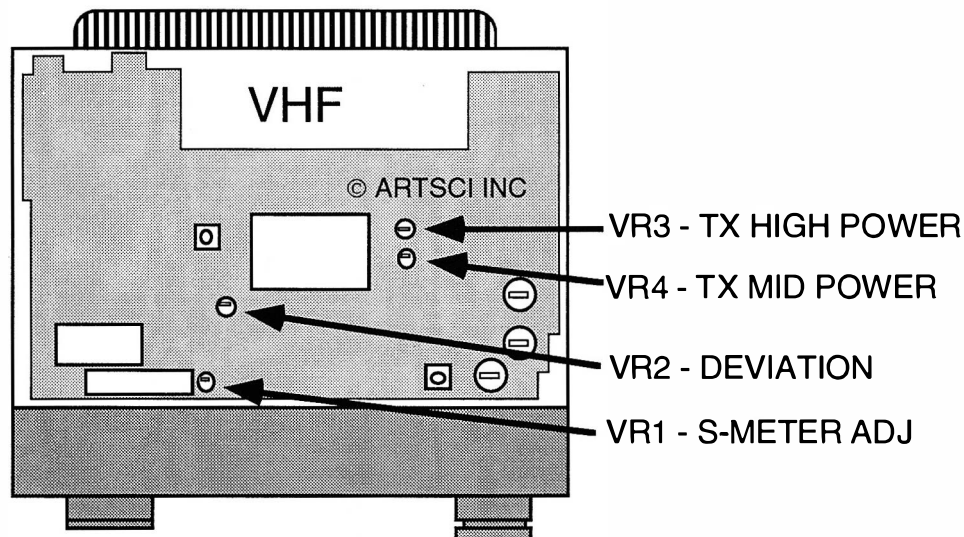


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

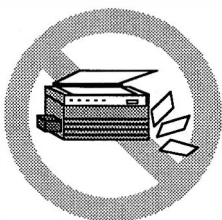
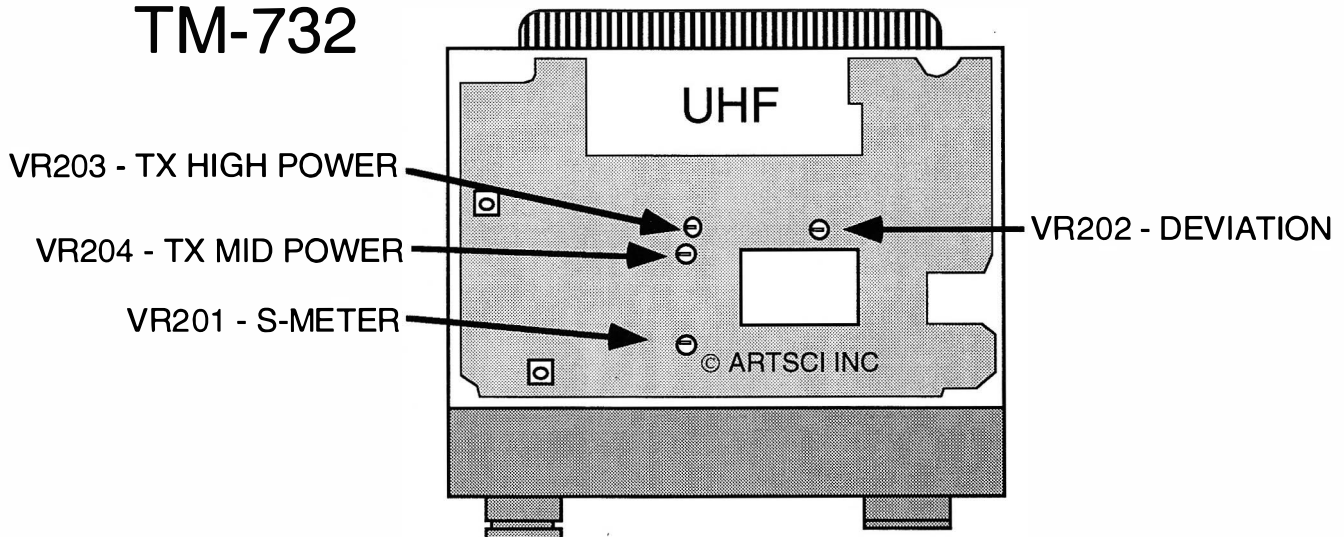
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-732A

## ALIGNMENT CONTROLS



## TM-732



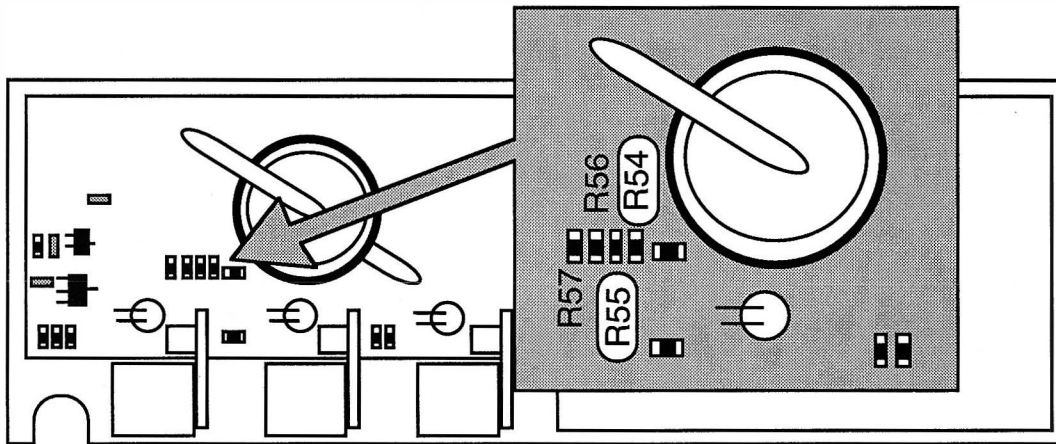
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-741

### EXPANDED RF

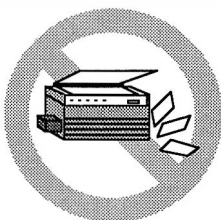
1. Remove power and antenna
2. Detach the front control head assembly.
3. Locate and **cut the GREEN wire** on the control board. The control board is on the body of the radio. The GREEN wire is located towards the left edge of the board. Tape the edges of the green wire to prevent shorting.
4. Remove the back cover from the control head.
5. Locate and **remove chip resistors R54 and R55**. Caution should be taken while removing these resistors.
6. Reassemble the control head.
7. Reassemble the transceiver.



New Frequency range:

18-54 MHz  
50-90 MHz  
118-174 MHz  
215-260 MHz  
410-470 MHz  
1100-1400 MHz

MORE ---



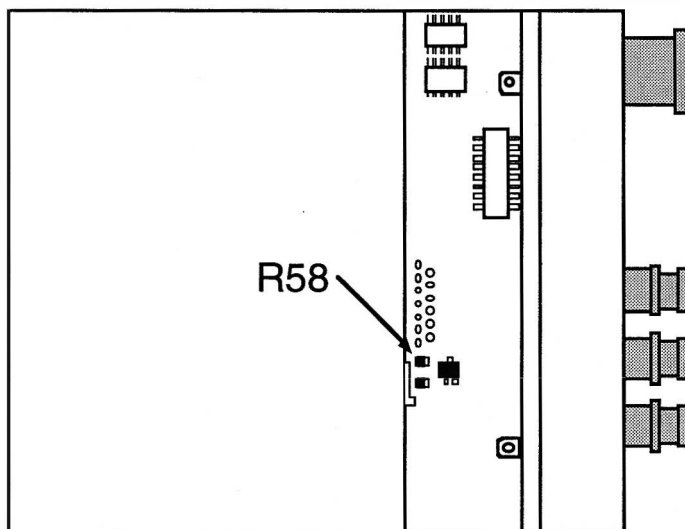
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TM-741 & TM-941

## CROSS BAND REPEATER

- 1 Remove power and antenna and the top and bottom covers.
2. Detach the front panel assembly.
3. Locate and **cut the GREEN wire** on the control board. The control board is on the body of the radio. The GREEN wire is located towards the left edge of the board.
4. Locate and **cut resistor R58**. R58 is blue colored and located on the control board (Cross band repeater mod)
5. Reassemble the transceiver.

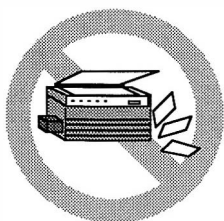


**CROSS BAND OPERATING PROCEDURES:** The TM-X41 will receive a signal on one band and will automatically re-transmit it on the other band. Each band can contain shift information. Only one band may contain PL encode/decode information. Only one band may contain Tone and CTCSS.

- 1 Select one of the band using the BAND SELECT key.  
(The PTT indicator will light.)
2. Select the other band by pressing the CONTROL SELECT key.  
(Skip this step for one way repeat only)  
(The green light on the key will light.)

### Turn on / off the Repeater mode :

Press the [F] key and then press the [MUTE] key.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

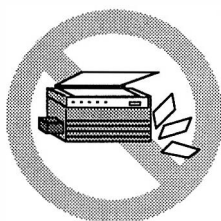
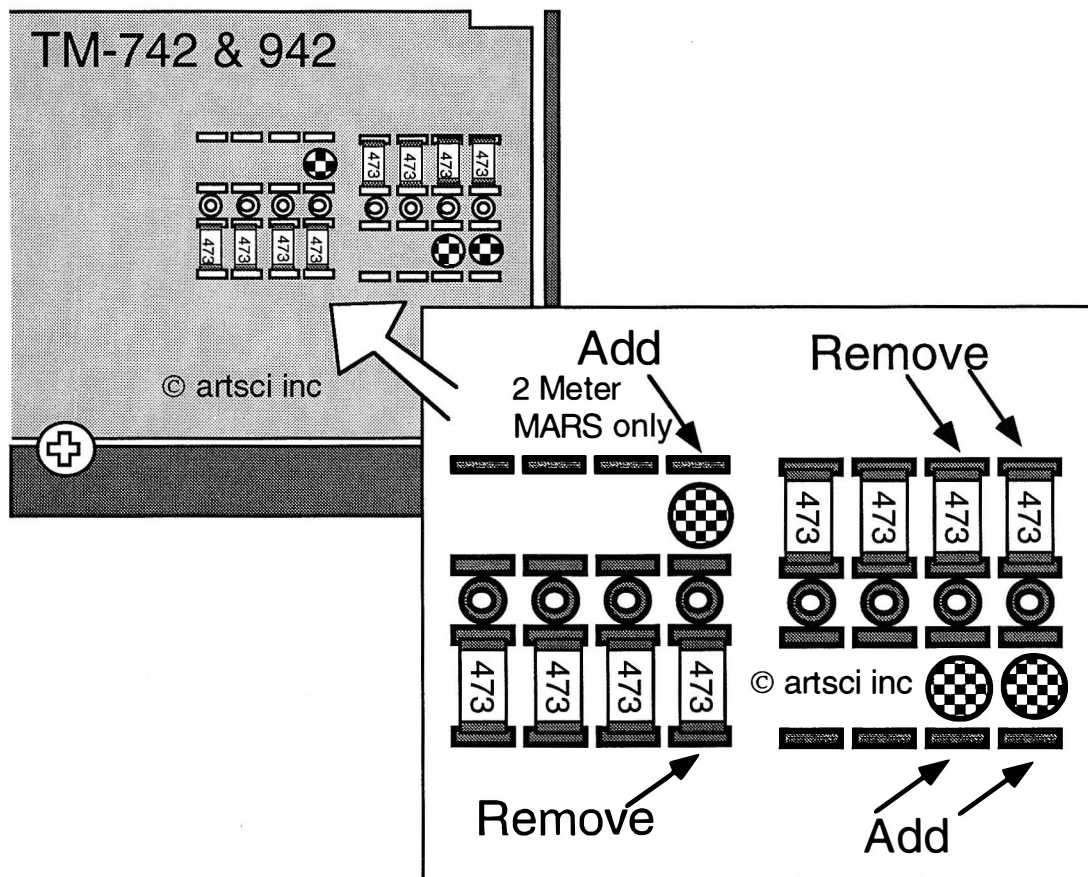
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM-742 & TM-942

### EXPANDED RF

(28 MHz - 18-54 RX/26-45 TX) (50 MHz - 40-90 RX/46-76 TX)  
(144 MHz - 136-184RX&TX) (220 MHz - 215-260 RX 215-235 TX)  
(440 MHz 410-470 RX&TX) (1.2 GHz - 1100 - 1400 RX&TX)

1. Remove power and antenna.
2. Remove the front panel from the main body.
3. Remove the 4 screw on the bottom cover.
4. Loosen the 4 screws on the side of the radio.
5. Locate the control unit (the large board near the front panel area).
6. as indicated below (You will be using them in the next step).
7. Reassemble the radio.
8. **Reset the microprocessor** (Press and hold the [MR] key and turn power on)



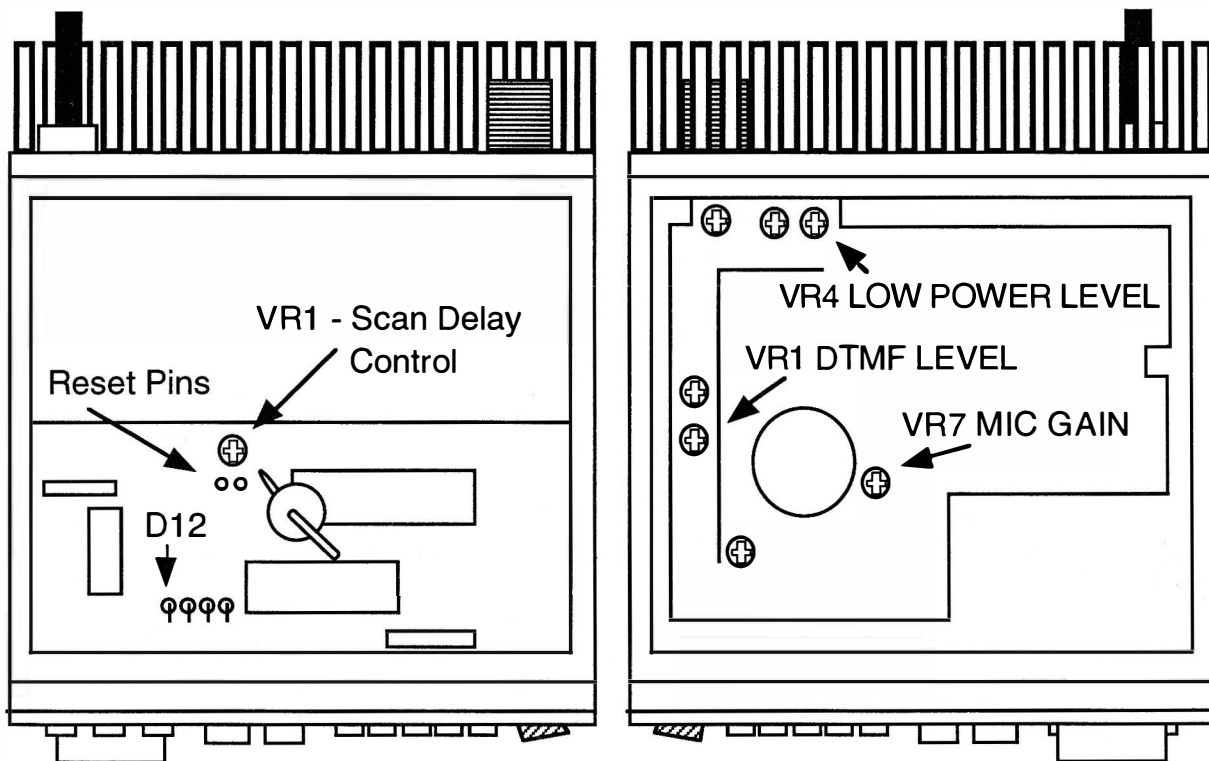
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

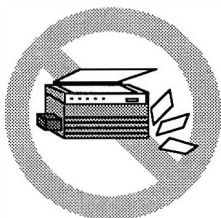
# KENWOOD TM-2530, TM-2550, TM-2570

## EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the bottom case .
3. Locate the Control Unit on the bottom of the radio. This is the same board the TU-7 & MU-1 are mounted on.
4. **CUT diodes D8 & D11 & D12.** They are located to the left of IC3.
5. Reassemble the radio.
6. **RESET the CPU.** (Press and hold the [PS] Key while turning on the radio.)



Frequency increases to 150.995 MHz



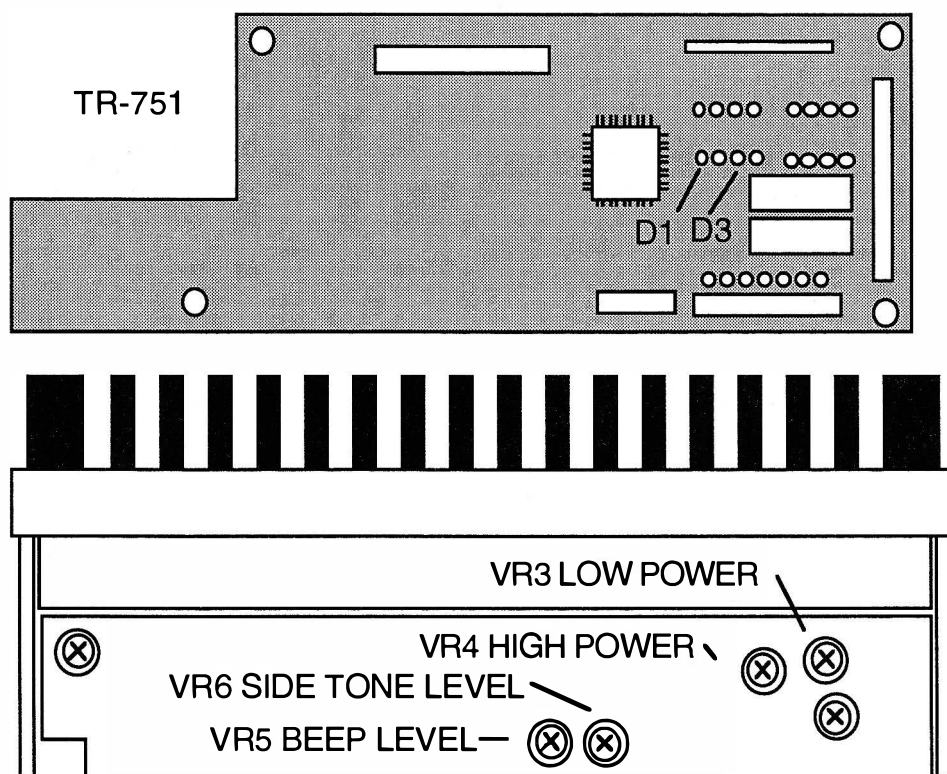
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

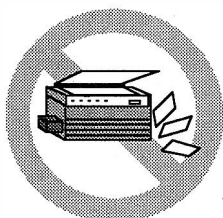
# KENWOOD TR-751

## EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the case .
3. Locate the Control Unit on the radio.
4. **CUT diodes D1 & D3.** They are located to the left of IC3.
5. Reassemble the radio.
6. **RESET the CPU.** (Hold [M] key and turn on power)



DEVIATION - VR7 ON RX UNIT (OTHER SIDE)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

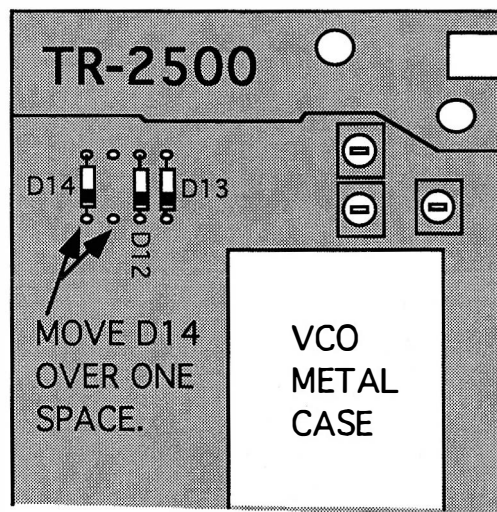
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



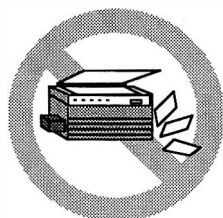
# KENWOOD TR-2500

## EXPANDED RF M/C

1. Disconnect the battery and antenna.
2. Remove the 3 screws holding on the back cover.
3. Remove the 2 screws on the bottom of the radio.
4. Unsolder the tabs of the lithium battery.
5. **Unsolder Diode D14.**
6. **Install the diode in the location next to D12.**
7. Reinstall the lithium battery.
8. Reassemble the radio.



Range : 141.000 MHz to 151.000 MHz



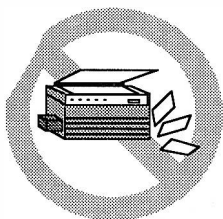
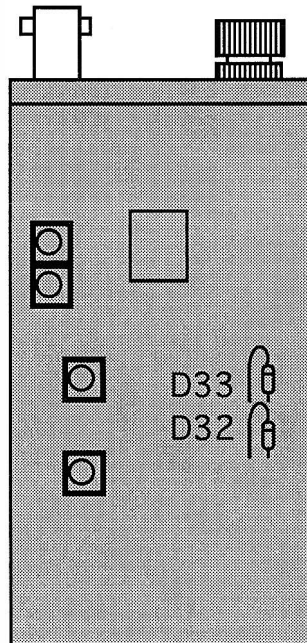
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TR-2600

### EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the screws and open the radio.
3. **Remove diodes D32 & D33.** They are located on the RX unit (x%%-1380-XX)
4. **Press the RESET Switch**
5. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

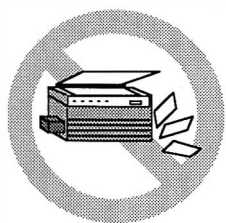
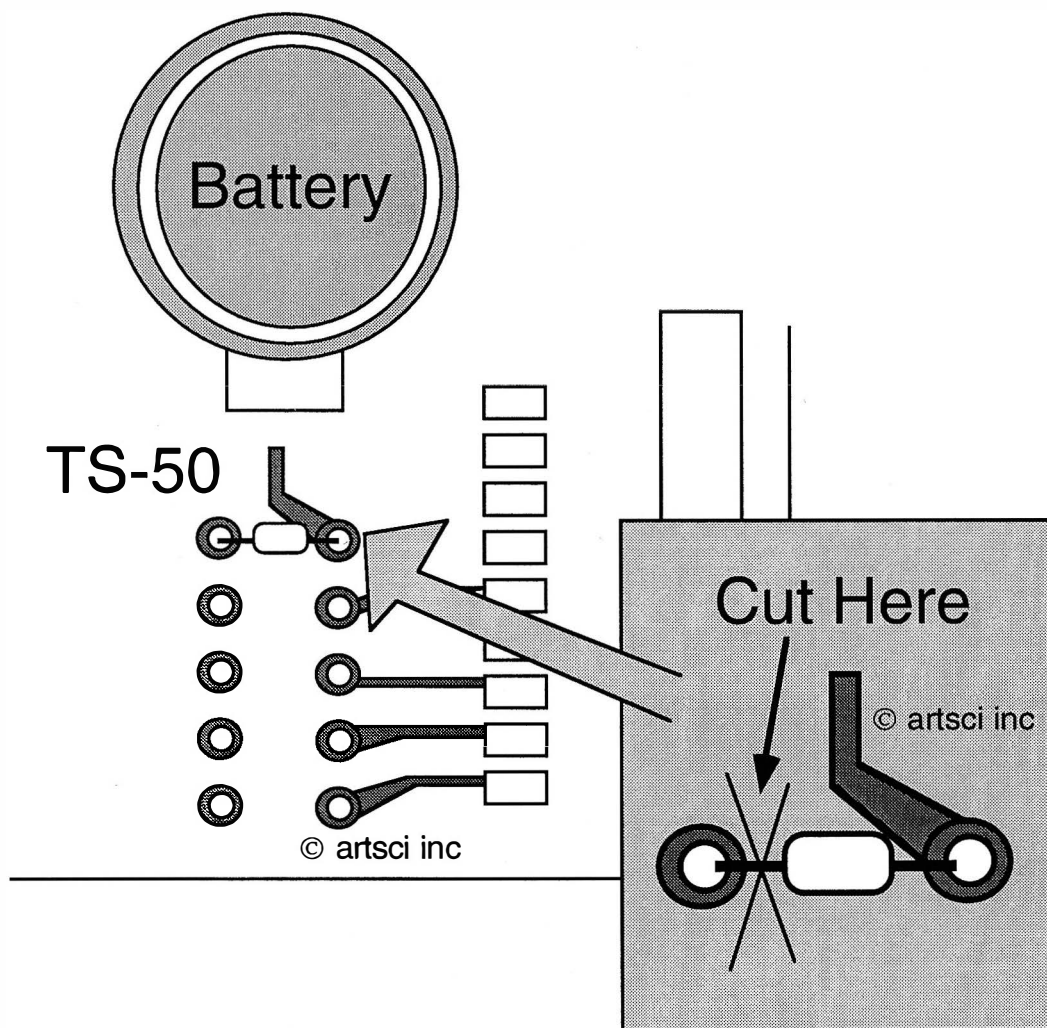
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TS-50

## EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the 5 screws holding on the bottom cover.
3. Loosen the 4 screws on the side of the radio & remove the bottom cover.
4. Place the radio upside down with the top towards you.
5. Locate and **remove Diode D5** on Digital unit. See diagram.
6. Reassemble the radio
7. **Reset the microprocessor** (Press and hold [A=B] and turn power on)



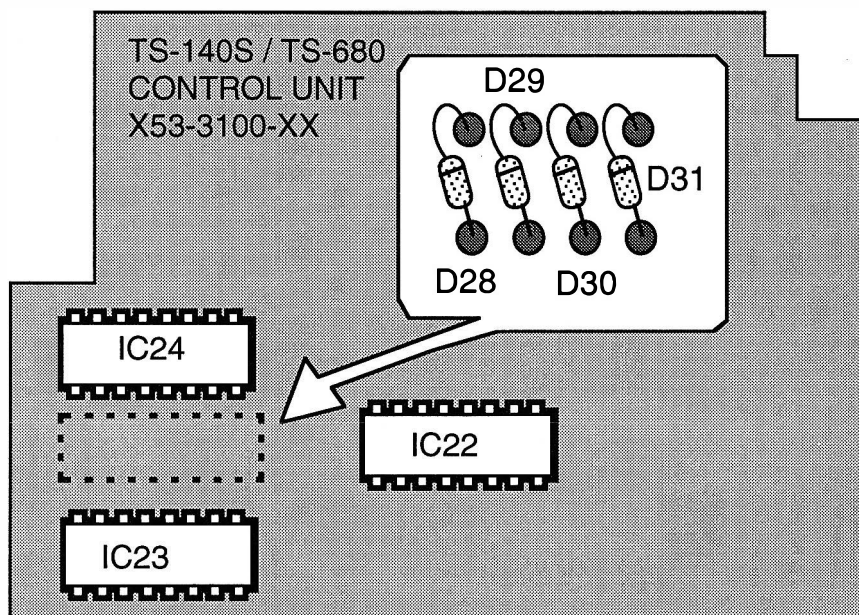
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TS-140S

### EXPANDED RF M/C

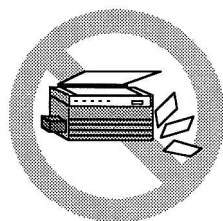
1. Disconnect the power and antenna.
2. Remove the top and bottom covers from the radio.
3. Locate the Control board on the bottom of the TS-140S
4. **Remove diode D31** on the Control board.
5. Reassemble the radio.
6. **RESET the CPU.**



#### Auxiliary Function:

1. Put radio in VFO mode and turn power off.
2. Press and hold [VFO/M] & [LSB/USB] and turn power on.

The display will say " -HELLO-"  
The CW announcement will please you.



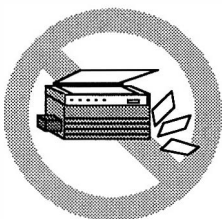
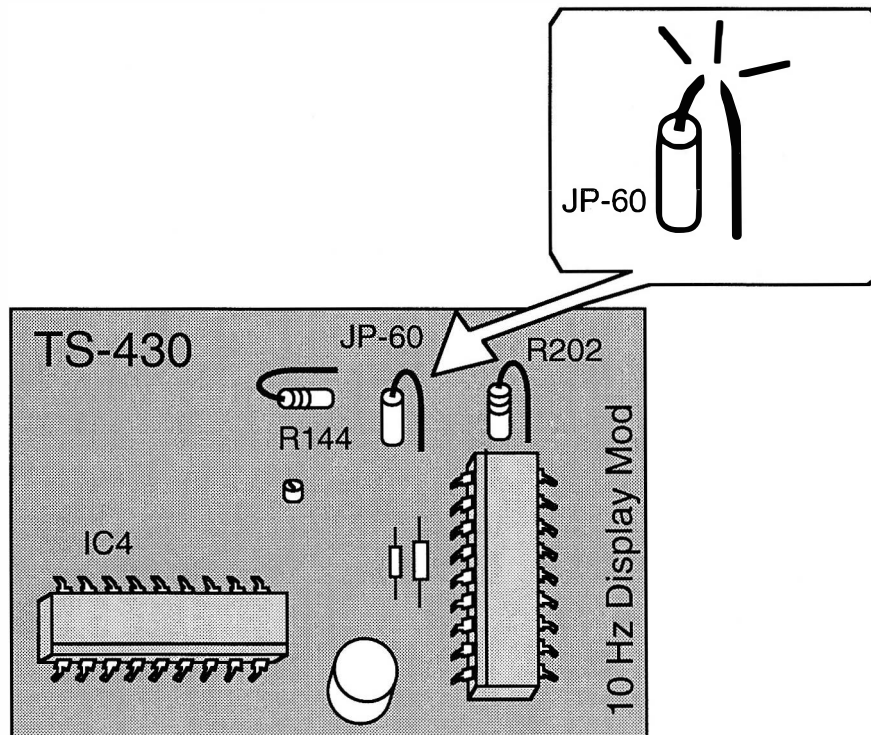
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TS-430S

## EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom covers from the radio.
3. Locate connector # 10 on the RF circuit board
4. **Cut the two wires that are NOT GREEN.** Leave the Green Wire.
5. Wrap Tape around the ends of the cut wires.
6. Locate CONTROL unit and **cut JP-60** for 10 Hz display. See below
7. Reassemble the radio.
8. **RESET the CPU.**



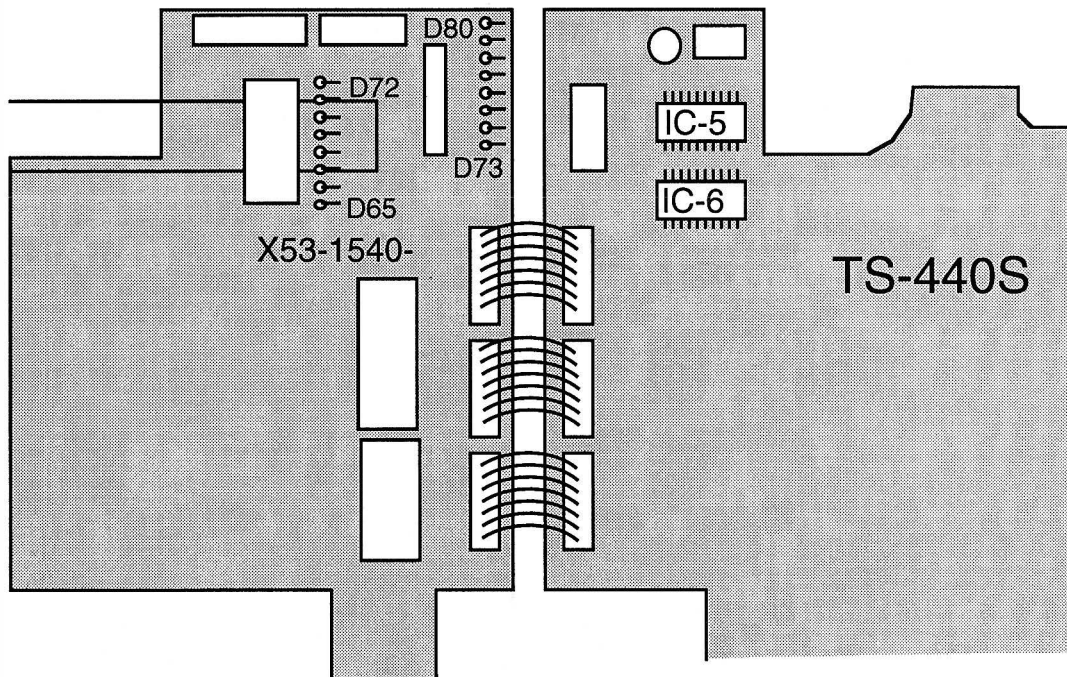
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

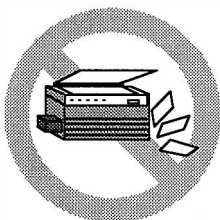
# KENWOOD TS-440S

## EXPANDED RF M/C

1. Disconnect the Power and antenna.
2. Remove the top and bottom covers from the radio.
3. Remove the Countersunk screws that secure the front panel to the chassis. There are two on each side
4. Gently pull the front panel forwards.
5. Remove the 5 small round head screws that secure the shield plate to the front panel. There are 2 on top and 3 on the bottom.
6. **Remove Diode D80.** D80 is located in the corner near Connector 54.
7. **Cut Diode 66 for 10 Hz resolution.** See page 24 of the instruction manual.
8. Reassemble the radio.
9. **RESET the CPU.**



RESET CPU: Press and hold [A=B] and turn power on.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

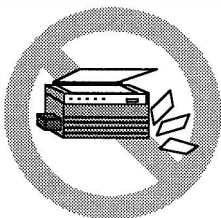
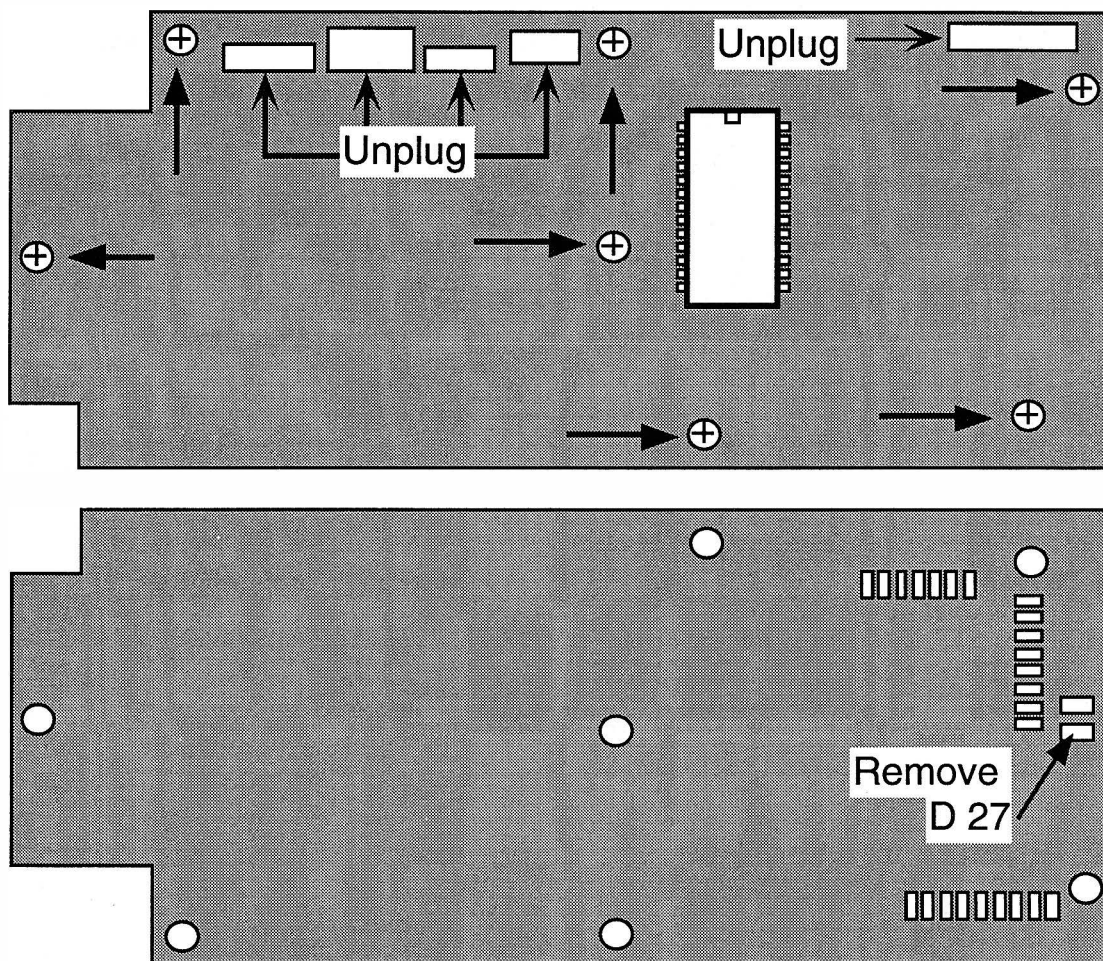
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TS-450S

## EXPANDED RF M/C

1. Disconnect the Power and antenna.
2. Remove the top and bottom covers from the radio. (14 Screws)
3. Remove the top screws (countersunk) from each side of the front panel.
4. Loosen the bottom screws (countersunk) from each side of the front panel.
5. Carefully pull the top front of the front panel forward to expose the Digital board.
6. Remove the seven screws from the digital board.
7. Disconnect the 5 cables from the digital board.
8. Rotate the board towards the front panel to gain access to the back side of the board.
9. Locate and **remove diode D27**. Do not pry up the diode. The traces will rip apart.
10. Reassemble the radio.



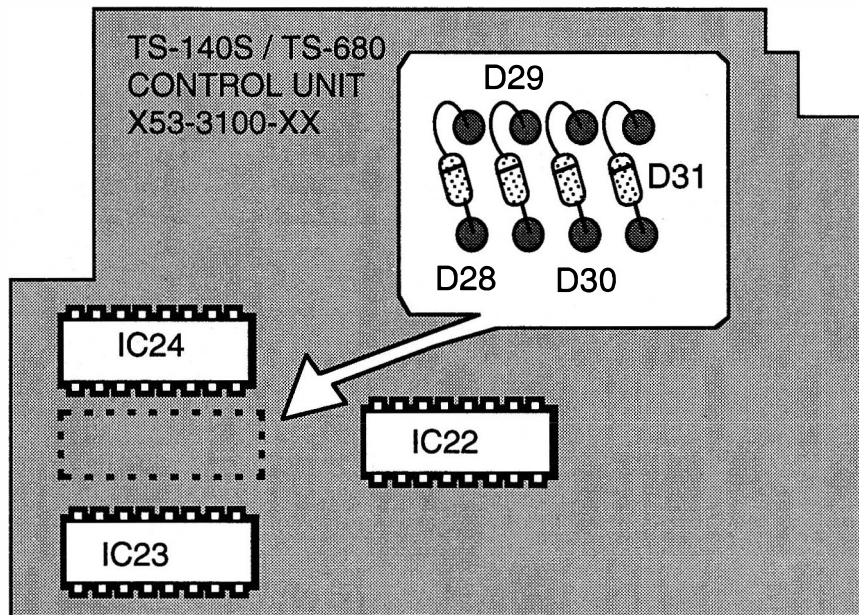
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TS-680

## EXPANDED RF M/C

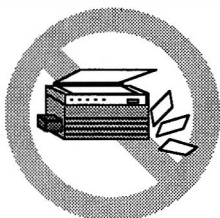
1. Disconnect the power and antenna.
2. Remove the top and bottom covers from the radio.
3. Locate the Control board on the bottom of the TS-680S
4. **Remove diode D31** on the Control board.
5. Reassemble the radio.
6. **RESET the CPU.**



### Auxiliary Function:

1. Put radio in VFO mode and turn power off.
2. Press and hold [VFO/M] & [LSB/USB] and turn power on.

The display will say " -HELLO-"  
The CW announcement will please you.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

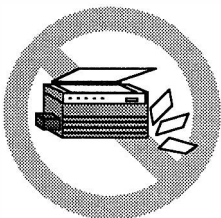
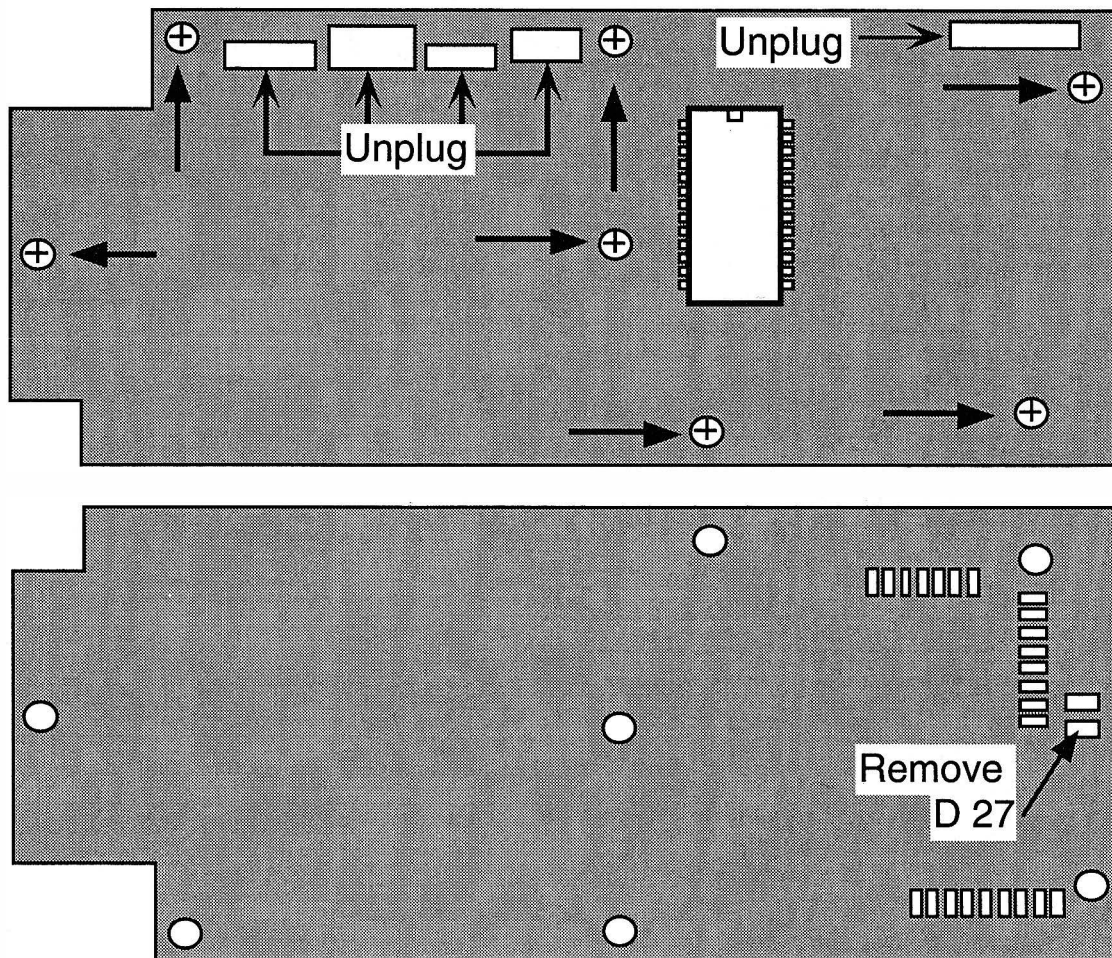
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TS-690S

## EXPANDED RF M/C

1. Disconnect the Power and antenna.
2. Remove the top and bottom covers from the radio. (14 Screws)
3. Remove the top screws (countersunk) from each side of the front panel.
4. Loosen the bottom screws (countersunk) from each side of the front panel.
5. Carefully pull the top front of the front panel forward to expose the Digital board.
6. Remove the seven screws from the digital board.
7. Disconnect the 5 cables from the digital board.
8. Rotate the board towards the front panel to gain access to the back side of the board.
9. Locate and **remove diode D27**. Do not pry up the diode. The traces will rip apart.
10. Reassemble the radio.



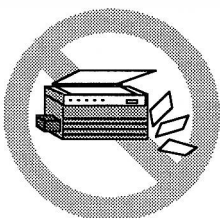
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TS-711

## EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the covers.
4. **REMOVE D30**
5. Reassemble the radio.
6. **RESET the CPU.**



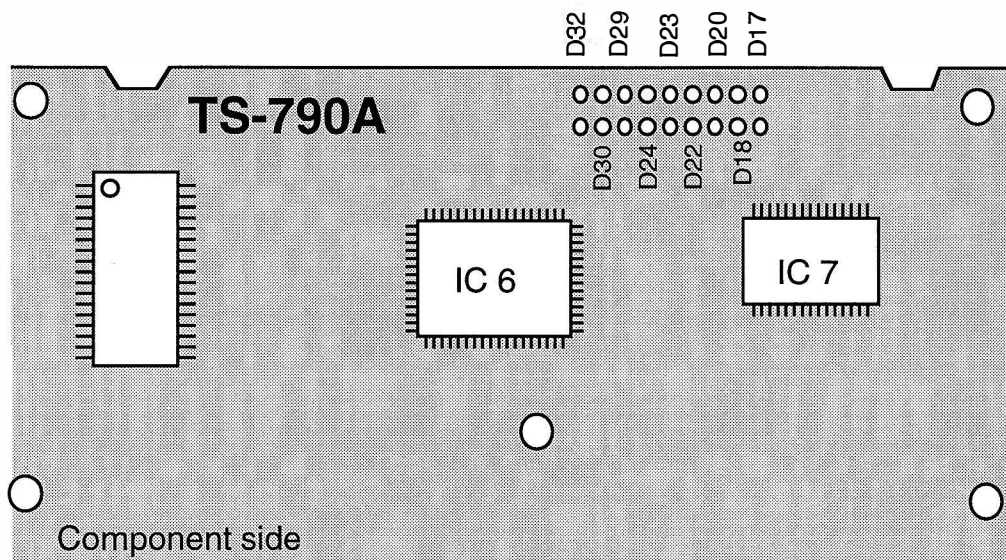
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TS-790A

## EXPANDED RF & X-BAND REPEATER

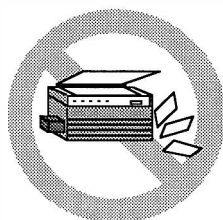
1. Disconnect the power and antenna.
2. Remove the top cover.
3. Locate circuit board positioned vertically behind the front panel.
4. Locate and **remove diodes D29 & D30.**
5. Locate and **remove diode D32.** (X-Band mod)
5. Reassemble radio
6. **Reset the microprocessor.** (Press and hold [A=B] and turn power on)



Note: Factory diode set-up: IN-D22,29,30,32  
 IN but clipped by factory-D23,24  
 Empty position=D17,18,20

RANGE: 130-170 MHz & 422.2-463 MHz

X-Band ON/OFF - [F] and then [M.IN] (A Star will appear on the display when on)  
 Reports state X-BAND works in all modes.



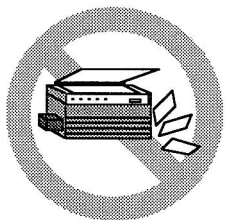
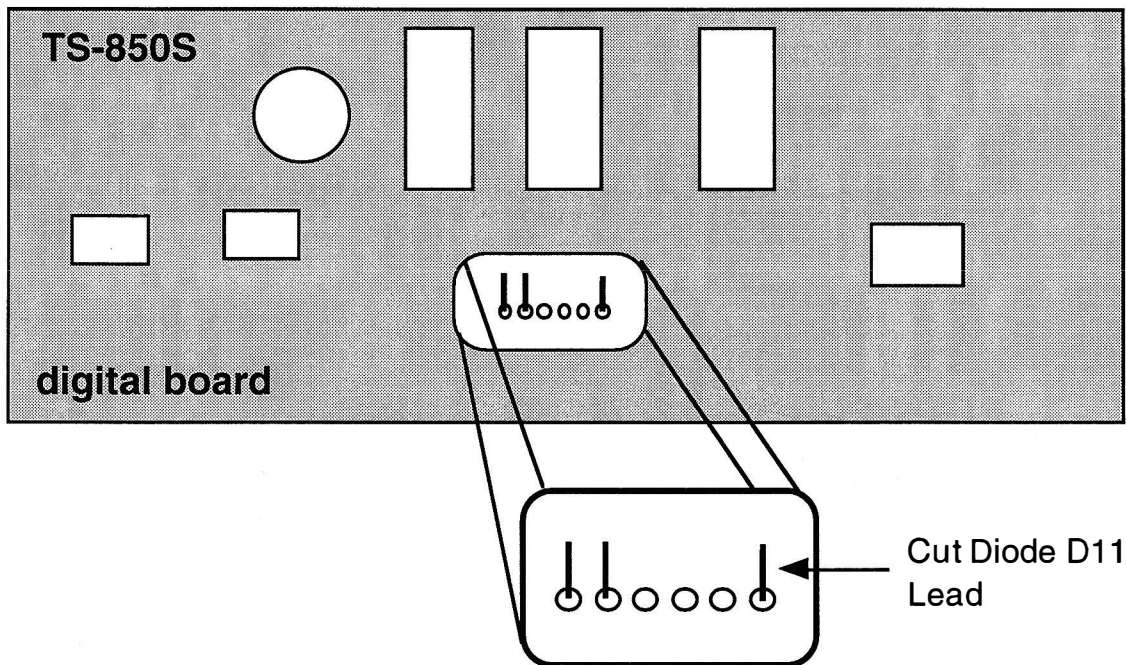
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
 HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any  
 modified radio may be a violation of FCC rules. Some modifications have not been  
 tested. The Author, Publisher and all other parties takes NO responsibility or liability  
 for any damage or violation resulting from these modifications.  
 If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TS-850S

### EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the 16 screws top and bottom covers from the radio. Be careful not to break the speaker wires.
3. Remove the top and bottom screws from each side of the front panel assembly.
4. Pull the front panel forward to expose the Digital board.
5. Locate and **cut the lead from diode D11**.
6. Reassemble the radio.
7. **Reset the microprocessor** (Holding the [A=B] Key while turning the power on.)



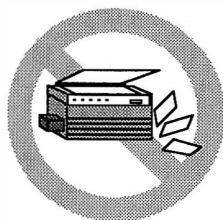
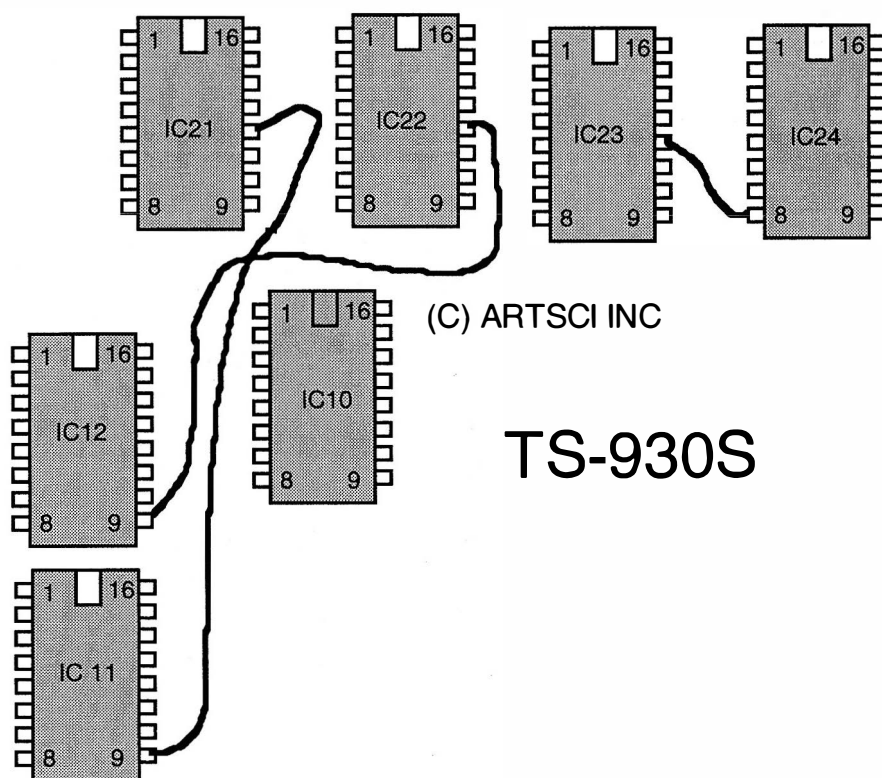
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# KENWOOD TS-930S

## EXPANDED RF M/C

1. Disconnect the power and antenna.
  2. Remove the top and bottom covers from the radio.
  3. Remove the four screws from the speaker mounting and the top panel Assembly.
  4. Swing the assembly away and unplug the Red/Black battery leads from the Digital unit X54-1680-00.
  5. **Solder wires between the following locations:**
    - IC21 Pin 12 to IC11 Pin 9
    - IC22 Pin 12 to IC12 Pin 9
    - IC23 Pin 12 to IC24 Pin 8
- Tack-solder on the component side of the board is OK
5. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

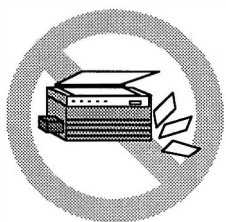
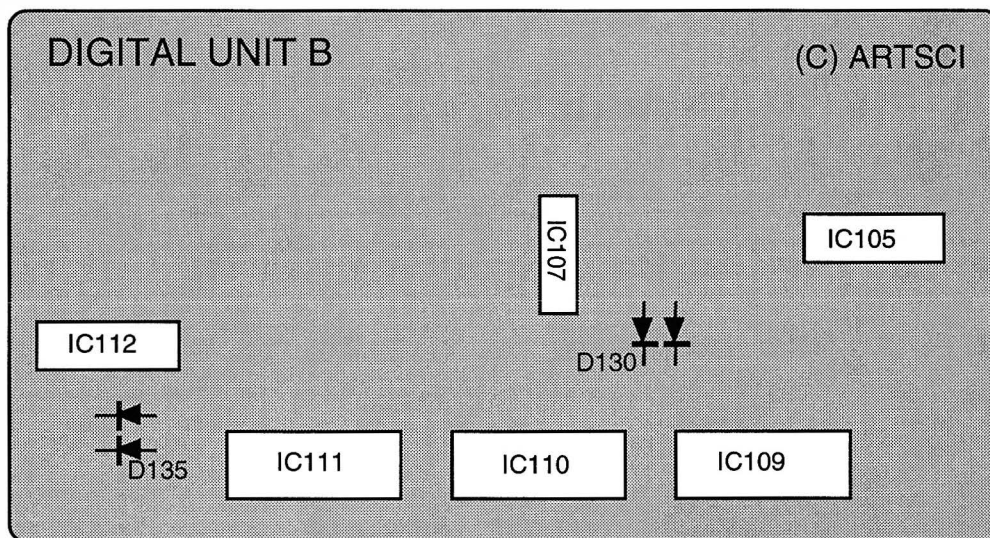
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TS-940

### EXPANDED RF

1. Disconnect the power and antenna.
2. Remove case screws and case.
3. Locate Digital Unit B. This is the board that is in the enclosure where the VS-1 is mounted. Digital Unit B is the board closest to the Front Panel.
4. **Cut Diodes D130 & D135.** Located near IC-109.
5. Reassemble the radio
6. Reset the microprocessor  
(Turn the radio on, Press and Hold the [A=B] Switch and turn off and back on the radio.)

### TS-940



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

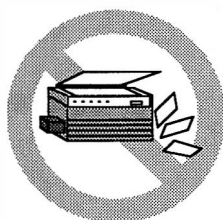
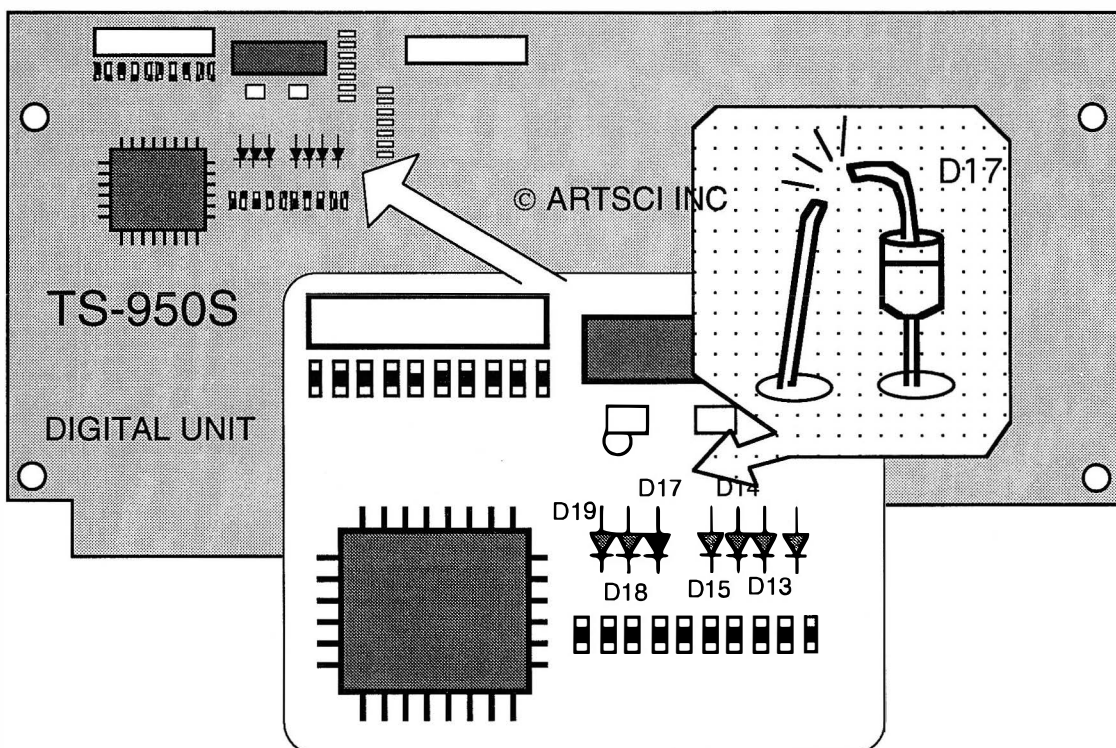


# KENWOOD TS-950SD

## EXTENDED RF

1. Remove power and antenna.
2. Remove the top and bottom covers
3. Locate the Digital Unit.
4. **Cut diode D-17**
5. Reassemble the Radio
6. **Reset the Microprocessor.**

RESET: Press and hold [A=B] and turn power on.



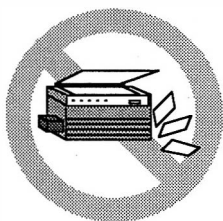
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TS-2400

### EXTENDED RF

1. Remove Power and Antenna.
2. Open the radio.
3. Locate the RX Circuit board.
4. Locate and **cut Diodes D32 and D33.** (Located near the DTMF IC)
5. Reassemble the radio.
6. **Reset the Microprocessor.**



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

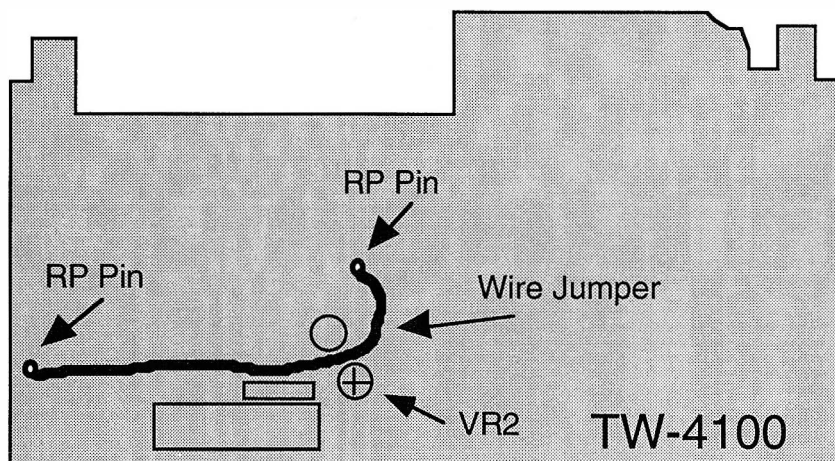
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# KENWOOD TW-4100

## REPEATER MOD

1. Remove power and antenna.
2. Remove 4 screws securing the top cover.
3. Remove 10 screws securing the bottom cover.
4. **Solder a wire jumper connecting the two RP Pins.** (see drawing)
5. Reassemble the radio.



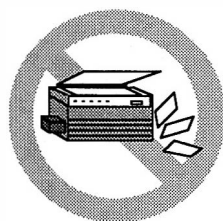
### CROSS BAND REPEATER PROCEDURES

The VFO and a Memory channel (except 8 & 9) must be used. Select the proper frequencies, offsets & tone. (VFO simplex operation must use DUP with a 0 offset.)

**TURN ON** - Enter frequencies in a memory and VFO and press [Shift].

Turn power off. Press and hold [REV] and turn radio on.

**TURN OFF** - Turn Power off.

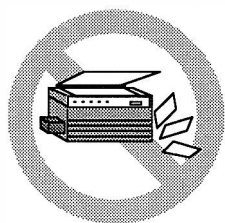
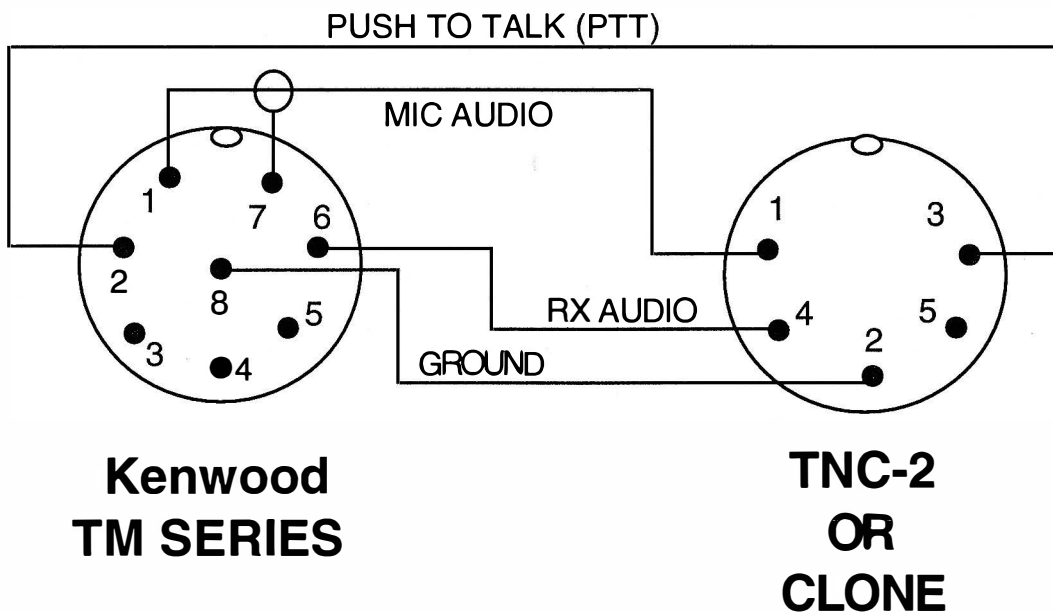


PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## KENWOOD TM SERIES

### TNC-2 HOOKUP



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

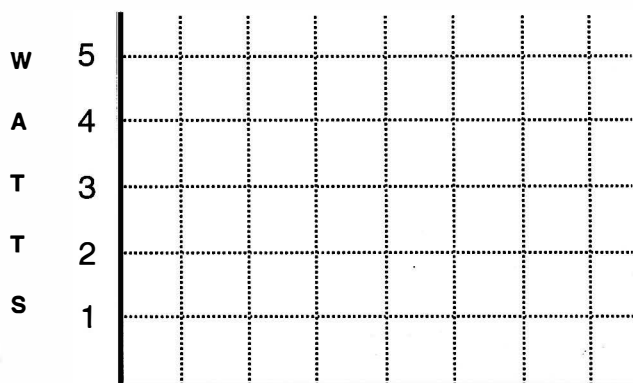
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

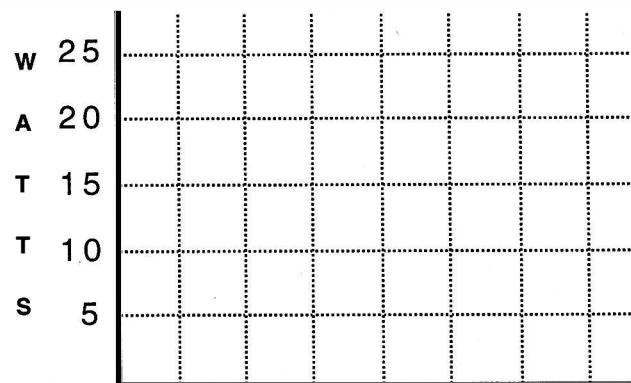
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

| Description                    | Before      | After       |
|--------------------------------|-------------|-------------|
| Power out (Low)                | _____ Watts | _____ Watts |
| Power out (High)               | _____ Watts | _____ Watts |
| Frequency Error (Simplex)      | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)       | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band) | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| PL Deviation                   | _____ Hz    | _____ Hz    |
| DTMF Deviation                 | _____ KHz   | _____ KHz   |
| Audio Deviation                | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr   | _____ MHz   | _____ MHz   |

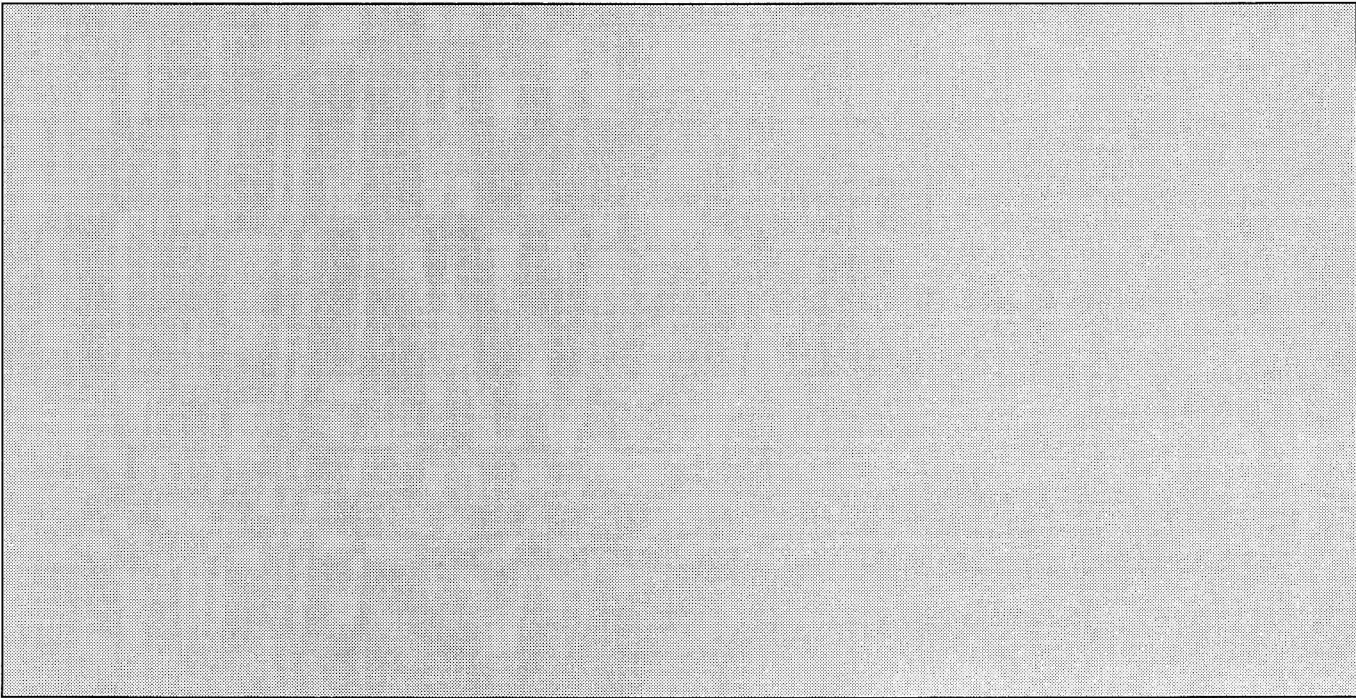


Frequency



Frequency

Lined area for notes.



# Radio / Tech Modifications

## SCANNER Modifications

| Model | Modification | Page # ] |
|-------|--------------|----------|
|-------|--------------|----------|

### BEARCAT/UNIDEN

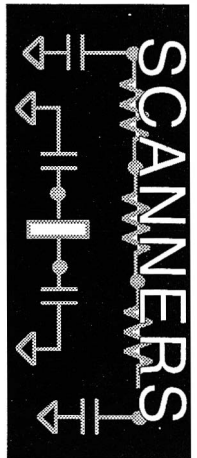
|         |                                          |       |
|---------|------------------------------------------|-------|
| BC-200  | Expanded RF & Battery Life Extender..... | S -3  |
| BC-205  | Expanded RF.....                         | S -4  |
| BC-700  | Expanded RF.....                         | S -5  |
| BC-760  | Expanded RF for older models.....        | S -6  |
| BC-760  | Expanded RF for newer models.....        | S -7  |
| BC-855  | Expanded RF.....                         | S -8  |
| BC-890  | Expanded RF.....                         | S -9  |
| BC-950  | Expanded RF for older models.....        | S -9  |
| BC-950  | Expanded RF for newer models.....        | S -11 |
| BC-2500 | Expanded RF.....                         | S -12 |
| MR-8100 | Expanded RF.....                         | S -14 |

### REGENCY

|        |                                          |       |
|--------|------------------------------------------|-------|
| R-4030 | Expanded RF & Battery Life Extender..... | S -15 |
| R-1600 | Expanded RF for older models.....        | S -16 |
| R-1600 | Expanded RF for newer models.....        | S -17 |

### RADIO SHACK

|          |                                            |       |
|----------|--------------------------------------------|-------|
| PRO-2004 | Expanded RF/More memories/Speed Increase.. | S -18 |
| PRO-2005 | Expanded RF.....                           | S -19 |
| PRO-2006 | Expanded RF.....                           | S -20 |
| PRO-2022 | Expanded RF.....                           | S -21 |
| PRO-2026 | Expanded RF.....                           | S -22 |
| PRO-33   | Expanded RF.....                           | S -23 |
| PRO-34   | Expanded RF.....                           | S -24 |
| PRO-37   | Expanded RF.....                           | S -25 |
| PRO-39   | Expanded RF.....                           | S -26 |
| PRO-43   | Expanded RF.....                           | S -27 |
| PRO-46   | Expanded RF.....                           | S -28 |



# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

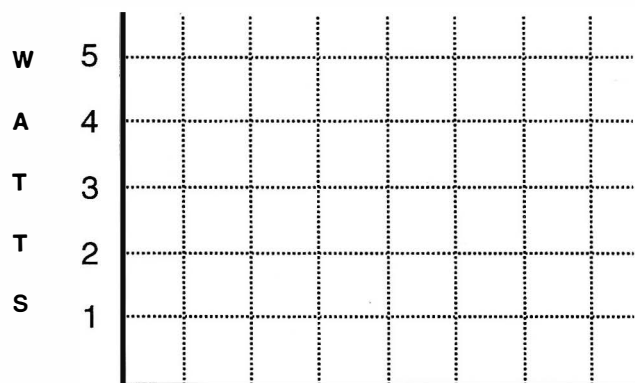
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

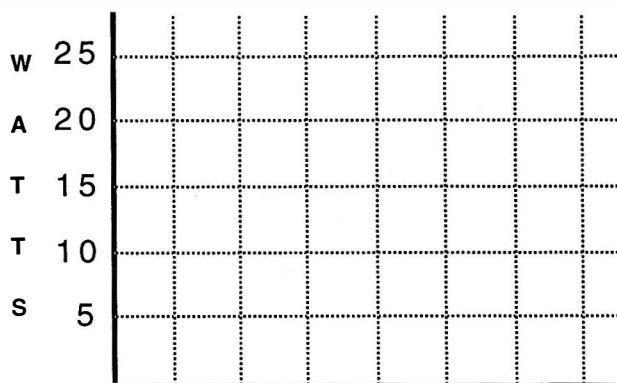
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

| Description                    | Before      | After       |
|--------------------------------|-------------|-------------|
| Power out (Low)                | _____ Watts | _____ Watts |
| Power out (High)               | _____ Watts | _____ Watts |
| Frequency Error (Simplex)      | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)       | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band) | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| PL Deviation                   | _____ Hz    | _____ Hz    |
| DTMF Deviation                 | _____ KHz   | _____ KHz   |
| Audio Deviation                | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr   | _____ MHz   | _____ MHz   |



Frequency



Frequency

# BEARCAT BC-200

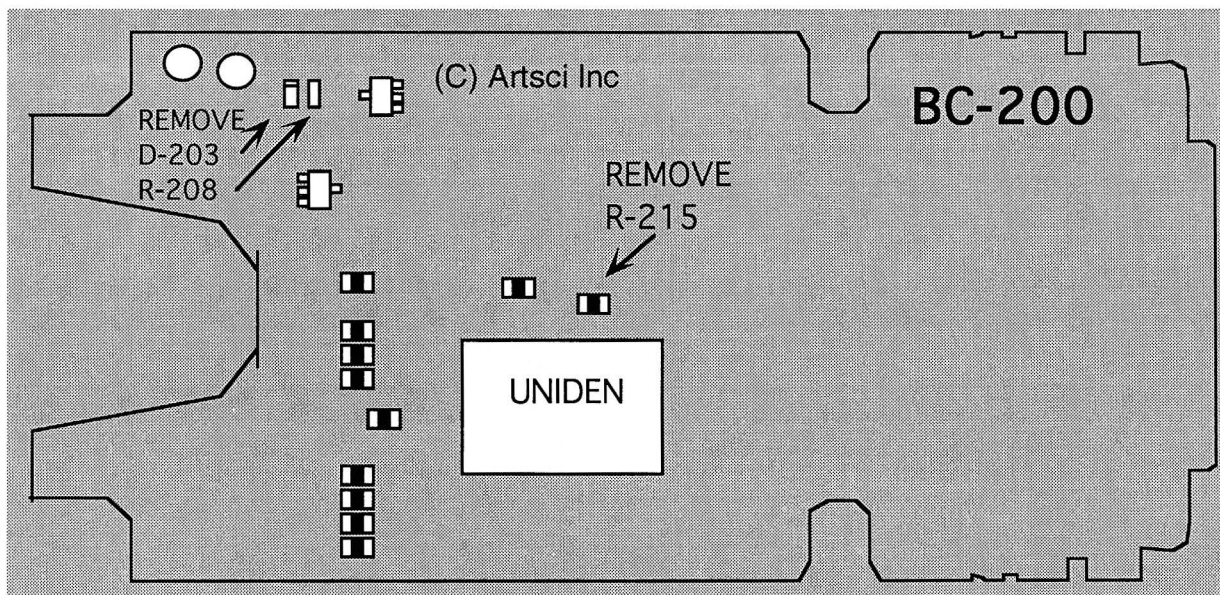
## EXPANDED RF (800MHz)

## Extended Battery Life

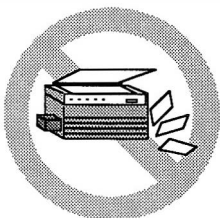
1. Remove Battery and Antenna.
2. Remove 2 screws from case and 2 from the battery retaining plate and open case.
3. Locate and remove two small screws at the base of the circuit board.
4. Gently pull the front panel from the circuits.
5. Locate and **remove the 10 K resistor R-215** located above the microprocessor (Uniden UC-1147). Note the resistor is above the "den" letters on the microprocessor.
6. Locate and remove the Diode D-203 and Resistor R-208 located by the Speaker. (Battery Mod)
6. Replace the front panel. Keep the holes in the bottom of the case and board lined up and make sure the dual in-line connector is reconnected properly.
7. Reassemble scanner.

If the radio fails to power up, recharge the battery or, the dual in-line connector was not inserted correctly. If the display will not work, make sure that the rows of fine pin are aligned properly with the socket.

Reset Command: Press & Hold [2], [9] & [MANUAL], Turn off and back on.



**EARPHONE OUTPUT FIX (Bypass the limiting resistor)** - Connect a wire from chassis ground to the earphone ground. Externally- Connect a wire from BNC Jack to Earphone jack. INTERNALLY - Open the radio & solder a wire from chassis ground to the ground earphone lug.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

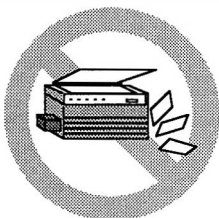
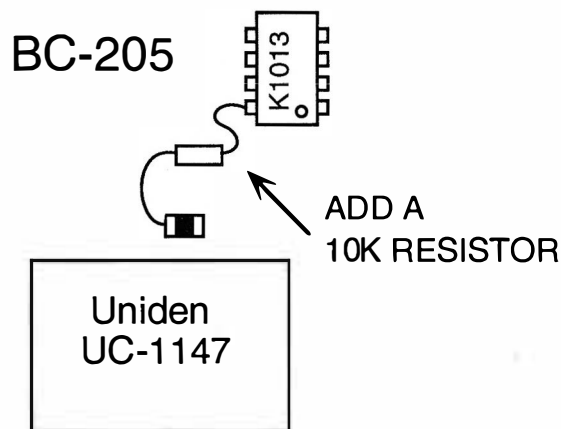


## BEARCAT BC-205

### EXPANDED RF (800MHz) Extended Battery Life

1. Remove Battery and Antenna.
2. Remove 2 screws from case and 2 from the battery retaining plate and open case.
3. Locate and remove two small screws at the base of the circuit board.
4. Gently pull the front panel from the circuits.
5. Locate the 10 K resistor located above the microprocessor (Uniden UC-1147). Note the resistor is above the "den" letters on the microprocessor.
6. **Add a 10K Resistor** to from the Chip resistor to Pin 8 of the adjacent K1013 IC.
7. Reassemble the radio.

If the radio fails to power up, recharge the battery or, the dual in-line connector was not inserted correctly. If the display will not work, make sure that the rows of fine pin are aligned properly with the socket.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

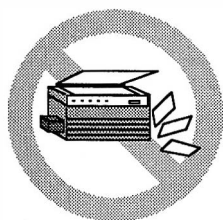
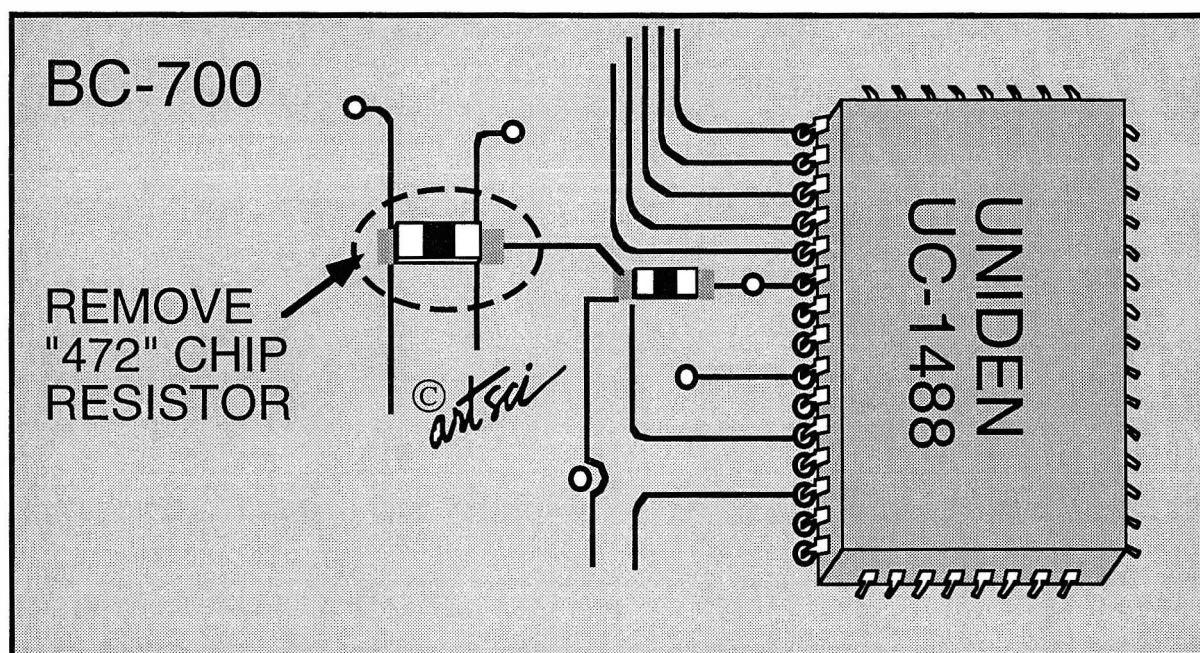
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## BEARCAT BC-700

EXPANDED RF (800MHz)  
(12.5 kHz spacing)

1. Remove Battery and Antenna.
2. Remove the screws from case and separate the two halves.  
(Unplug the speaker)
3. Remove two face plate screws (on bottom of face plate)
4. Unplug the cables to tilt the faceplate fully forward.
5. Locate and remove the copper/plastic shield under the faceplate.
6. Locate and **remove the chip resistor** (labeled "472") as shown.
7. Reassemble the radio.



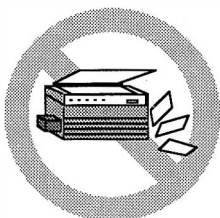
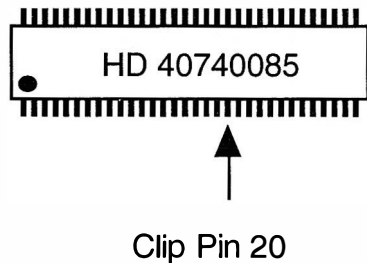
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## BEARCAT BC-760 EARLY MODELS (NO BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the microprocessor and **clip pin 20**.
4. Reassemble scanner.



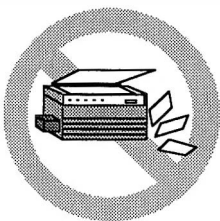
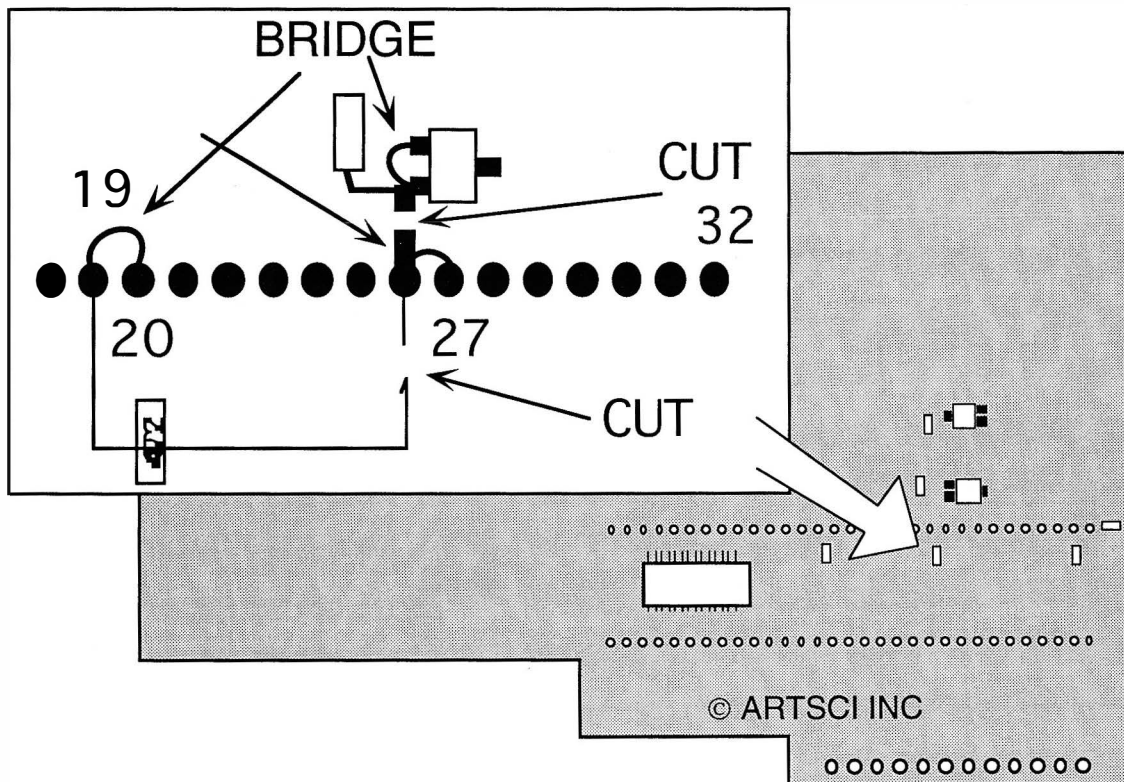
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## BEARCAT BC-760 LATER MODELS (WITH BNC CONNECTOR)

### EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the SANYO IC. (Identification printed upside down with the front of the radio facing you.
4. Locate the long row of solder pins above the Sanyo IC.
5. Locate Pin 26 of the Microprocessor.
6. **Cut the two traces leading to pin 26.**
7. **Solder bridge Pins 19 & 20 together**
8. **Solder bridge Pins 26 & 27 together.**
9. **Solder bridge the two leads of the chip transistor above pin 27.**
10. Unsolder or cut the 47K Chip Resistor marked "472"
11. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## BEARCAT BC-855XLT

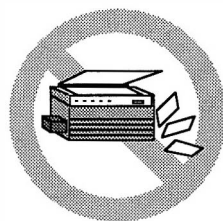
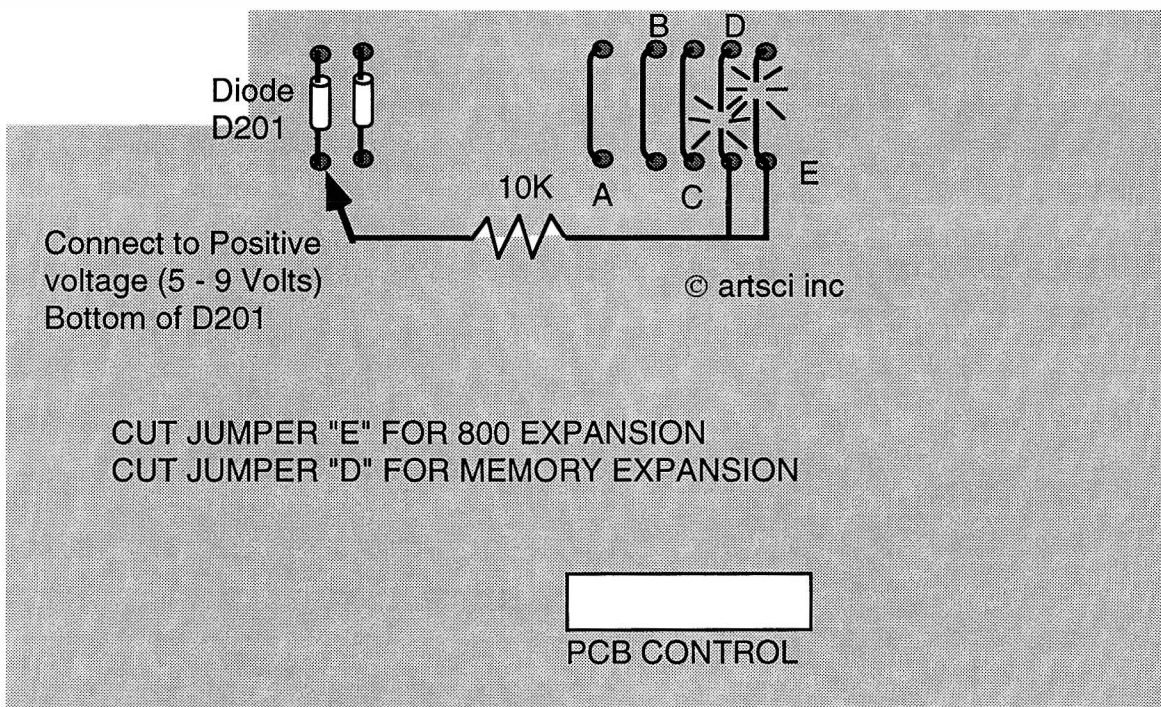
EXPANDED RF (800MHz)

806 - 956 Mhz

MEMORY EXPANSION

5 BANKS OF 20 CHANNELS EACH

1. Remove Power and Antenna.
2. Remove screws and open radio.
3. Locate and **CUT jumper "E"** (FOR 800 EXPANSION).
3. Locate and **CUT jumper "D"** (FOR MEMORY EXPANSION).
4. **Solder a 10K resistor from the cut position** . (see drawing)
5. Locate a positive voltage source and attach other end of 10K resistor,
6. Assemble radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

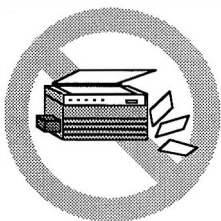
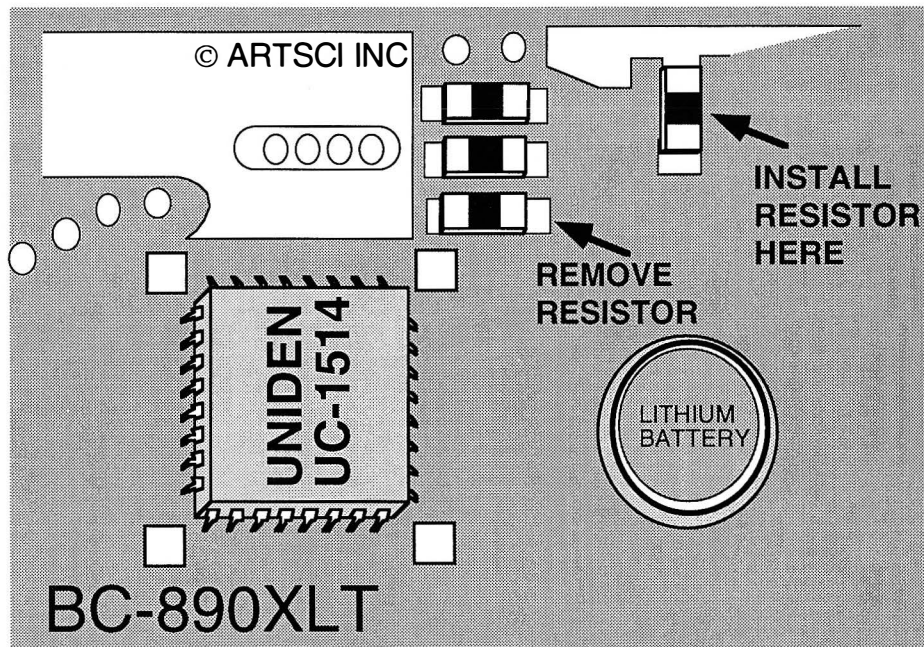
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# BEARCAT BC-890XLT

## EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 10 case screws and open radio. (Unplug the speaker wires)
3. Remove the 4 screws on the front panel and the one bracket screw.
4. Tilt front panel forward.
5. Unplug connectors J4 (white) & J5(blue)
6. Unplug the ribbon connectors J501, J502 & J503.
7. Position Logic board (on faceplate) and position board to match picture below.
8. Locate and **remove Chip Resistor** as shown (it is marked "104")
9. **Install the Chip resistor** as shown in drawing.
10. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## BEARCAT BC-950

EARLY MODELS (NO BNC CONNECTOR)

### EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the microprocessor and **clip pin 20**.
4. Reassemble scanner.



Clip Pin 20



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

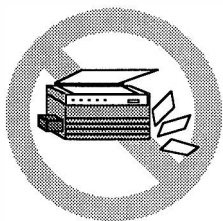
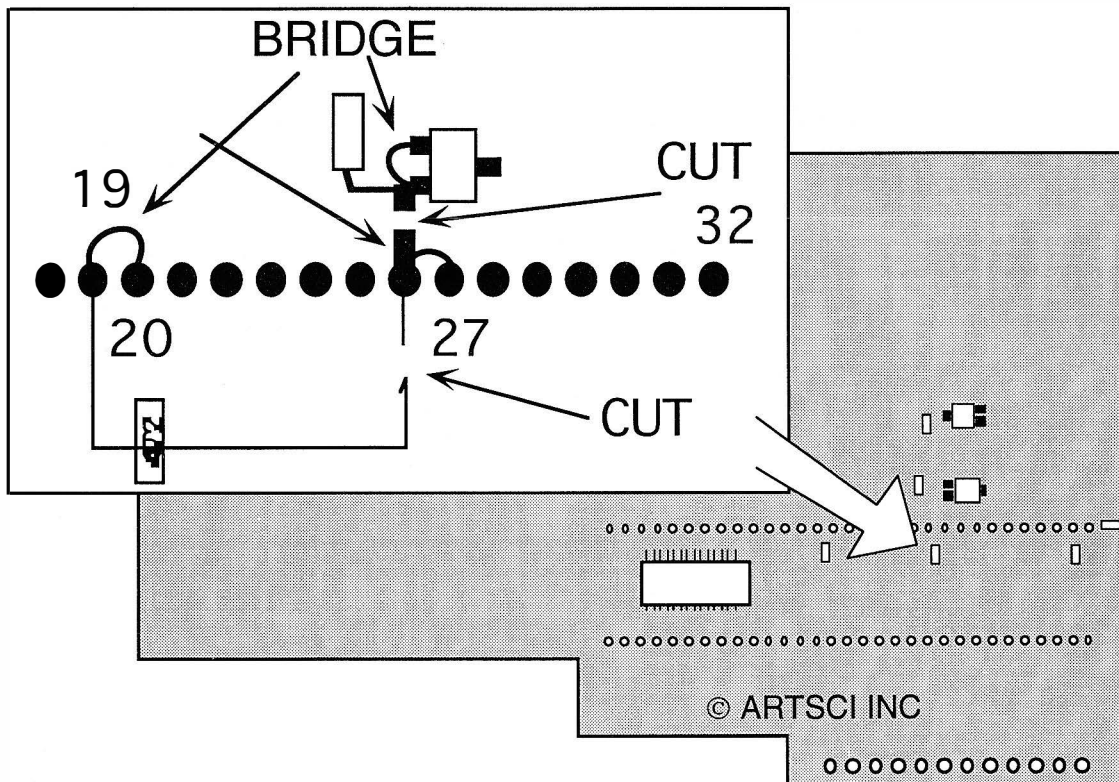
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



## BEARCAT BC-950XLT LATER MODELS (WITH BNC CONNECTOR)

### EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the SANYO IC. (Identification printed upside down with the front of the radio facing you.
4. Locate the long row of solder pins above the Sanyo IC.
5. Locate Pin 26 of the Microprocessor.
6. **Cut the two traces leading to pin 26.**
7. Solder bridge Pins 19 & 20 together
8. Solder bridge Pins 26 & 27 together.
9. Solder bridge the two leads of the chip transistor above pin 27.
10. Unsolder or cut the 47K Chip Resistor marked "472"
11. Reassemble the radio.



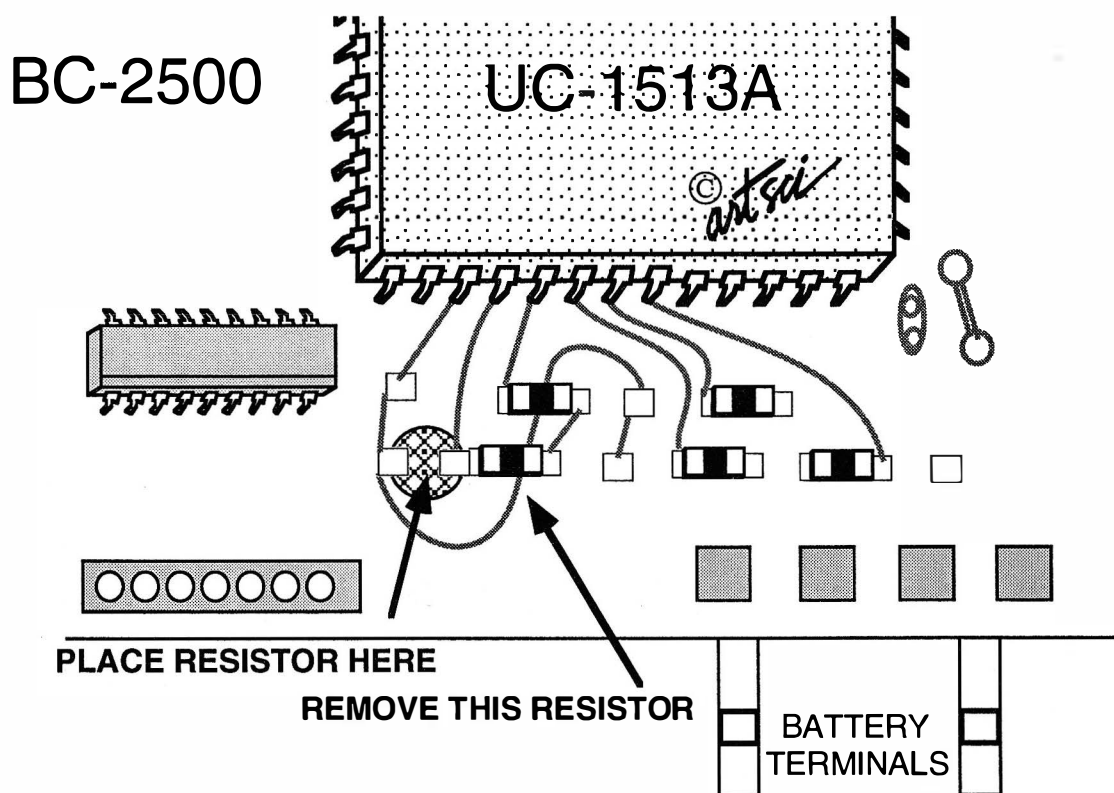
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## BEARCAT BC-2500XLT

### EXPANDED RF (800MHz) 30kHz steps

1. Remove Power and Antenna.
2. Remove the two black screws and the two silver screws from the back cover.
3. Open the radio
4. Locate the circuit board on the front half and unplug it from the front.  
(note unplug the board from the 11 pin molex connector)
5. Locate the microprocessor chip and the chip resistor below it.
6. Locate and **remove the indicated chip resistor and reinstall it as shown.**
7. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

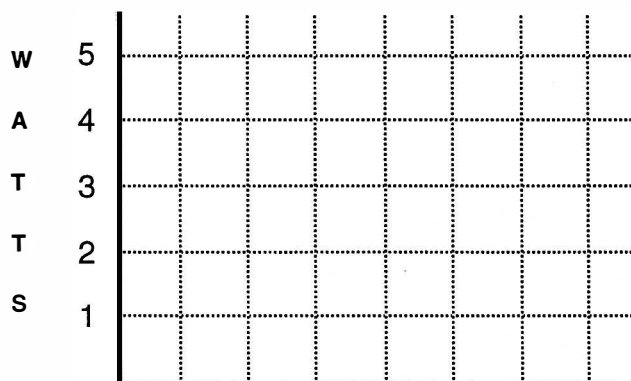
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

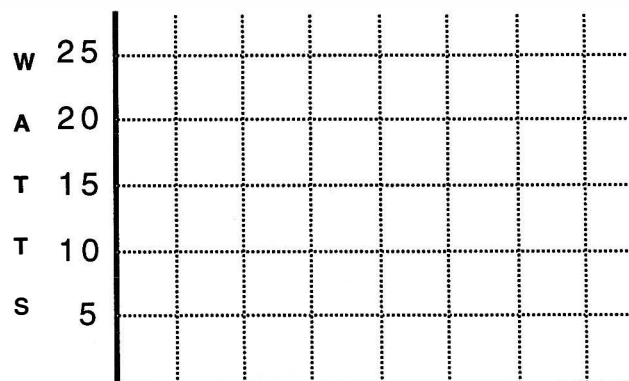
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

| Description                    | Before      | After       |
|--------------------------------|-------------|-------------|
| Power out (Low)                | _____ Watts | _____ Watts |
| Power out (High)               | _____ Watts | _____ Watts |
| Frequency Error (Simplex)      | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)       | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band) | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| Receive Sensitivity (____MHz)  | _____ uv    | _____ uv    |
| PL Deviation                   | _____ Hz    | _____ Hz    |
| DTMF Deviation                 | _____ KHz   | _____ KHz   |
| Audio Deviation                | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr   | _____ MHz   | _____ MHz   |



Frequency

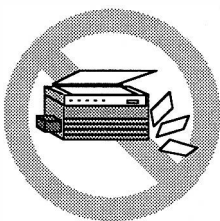


Frequency

## BEARCAT MR-8100

### EXPANDED RF (800MHz)

1. Connect radio to the programming computer.
2. Place [CAP LOCK]=OFF & [# LOCK]=OFF.
3. Press [CONTROL] [ALT] [P].
4. Press [CAP LOCK]=ON.
5. Type ECPA1986 [ENTER].
6. Enter expanded frequencies.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.

If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

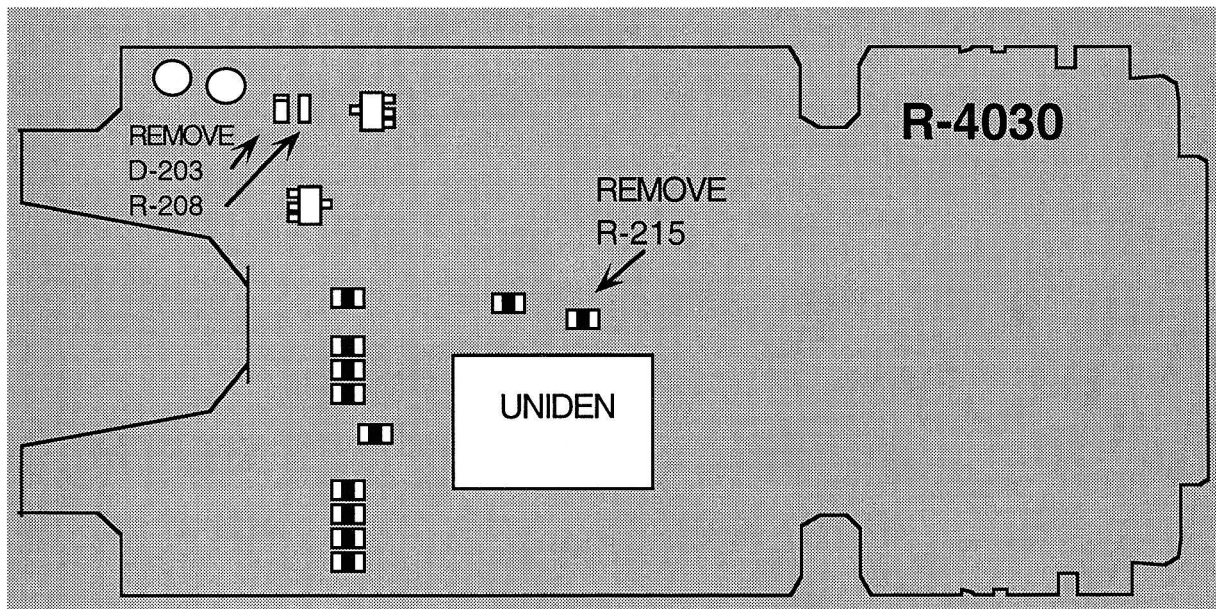
# REGENCY R-4030

EXPANDED RF (800MHz)

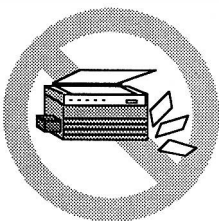
Extended Battery Life

1. Remove Battery and Antenna.
2. Remove 2 screws from case and 2 from the battery retaining plate and open case.
3. Locate and remove two small screws at the base of the circuit board.
4. Gently pull the front panel from the circuits.
5. Locate and **remove the 10 K resistor R-215** located above the microprocessor (Uniden UC-1147). Note the resistor is above the "den" letters on the microprocessor.
6. Locate and remove the Diode D-203 and Resistor R-208 located by the Speaker. (Battery Mod)
6. Replace the front panel. Keep the holes in the bottom of the case and board lined up and make sure the dual in-line connector is reconnected properly.
7. Reassemble scanner.

If the radio fails to power up, recharge the battery or, the dual in-line connector was not inserted correctly. If the display will not work, make sure that the rows of fine pin are aligned properly with the socket.



**EARPHONE OUTPUT FIX (Bypass the limiting resistor)** - Connect a wire from chassis ground to the earphone ground. Externally- Connect a wire from BNC Jack to Earphone jack. INTERNALLY - Open the radio & solder a wire from chassis ground to the ground earphone lug.



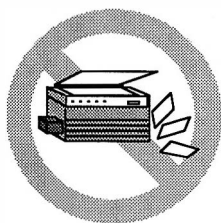
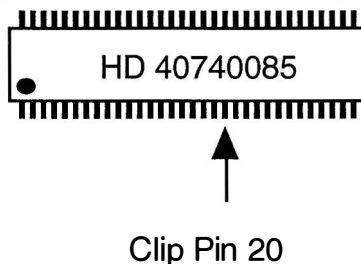
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## REGENCY R-1600 EARLY MODELS (NO BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the microprocessor and **clip pin 20**.
4. Reassemble scanner.



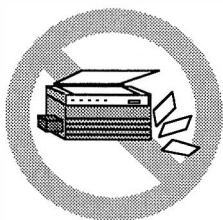
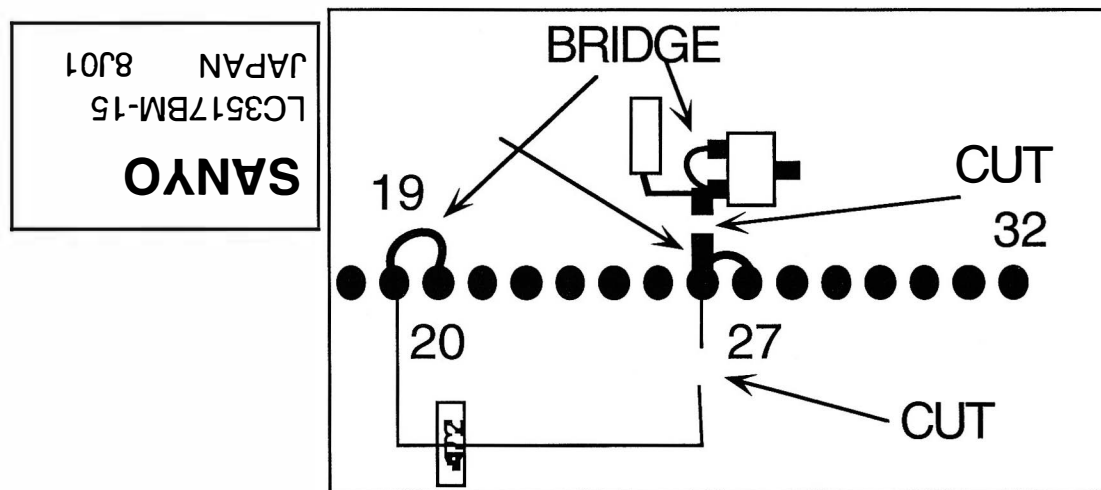
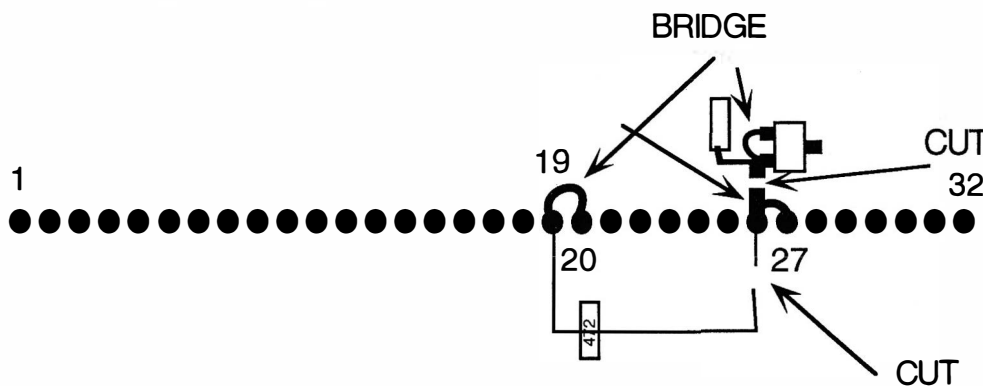
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## REGENCY R-1600 LATER MODELS (WITH BNC CONNECTOR)

### EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the SANYO IC. (Identification printed upside down with the front of the radio facing you.
4. Locate the long row of solder pins above the Sanyo IC.
5. Locate Pin 26 of the Microprocessor.
6. **Cut the two traces leading to pin 26.**
7. Solder **bridge** Pins 19 & 20 together
8. Solder **bridge** Pins 26 & 27 together.
9. Solder **bridge** the two leads of the chip transistor above pin 27.
10. Unsolder or **cut** the 47K Chip Resistor marked "472"
11. Reassemble the radio.



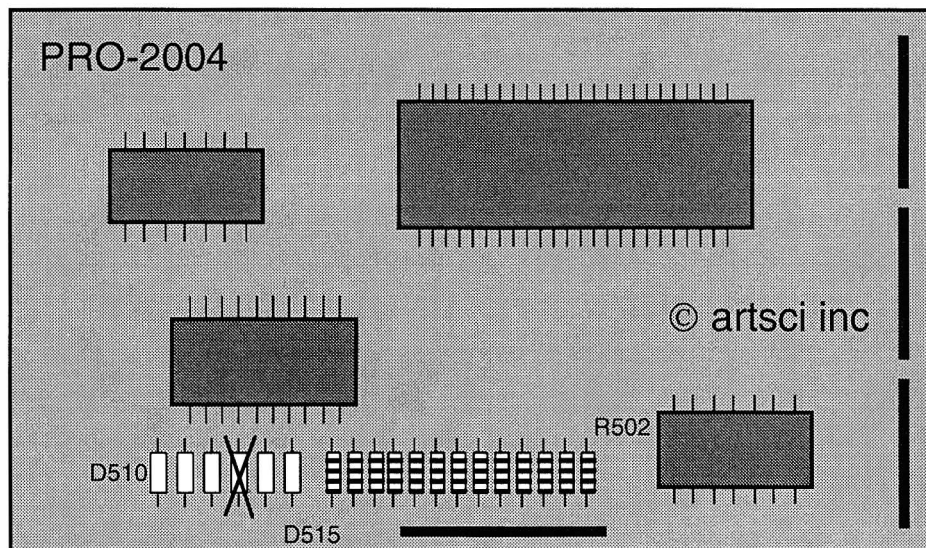
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## RADIO SHACK PRO-2004

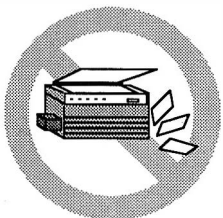
EXPANDED RF (800MHz)  
100 additional Memory Channels

1. Remove Power and Antenna.
2. Remove 4 screws from the case and slide the case off.
3. Locate circuit board PC-3
4. Remove metal cover on top side of PC-3
5. **Cut Diode D-513** (800 MHz Mod)
6. **Add a 1N914 or 1N4148 Diode in position D-510.** (for 400 memories)  
Note: Radio Shack part # 276-1122.  
Note: Diode locations D-510 and D-511 are not labeled
7. Replace metal cover
8. Reassemble radio.



### DIODE FUNCTIONS:

- D-510 Add for 400 memories
- D-512 Remove for 12.5KHz Stepping. (leave in for 30 KHz)
- D-513 Remove for 800 Band Receive.
- D-514 Add to increase scanning speed to 20 Channels per second



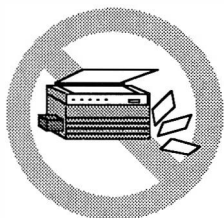
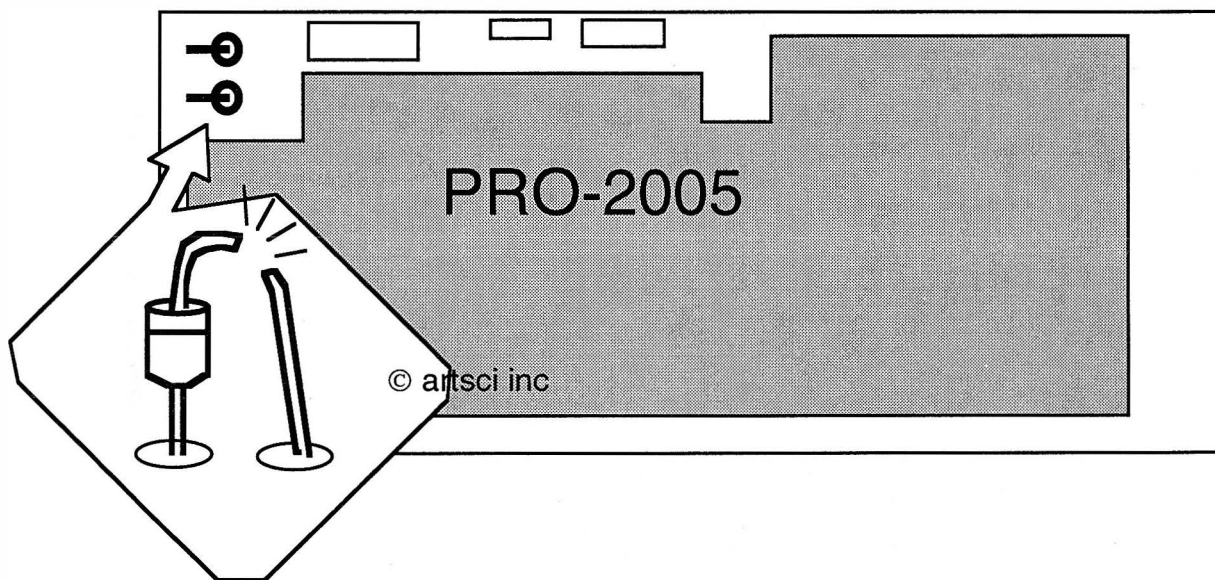
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## RADIO SHACK PRO-2005

EXPANDED RF (800MHz)  
SCAN SPEED INCREASE.

1. Remove Power and Antenna.
2. Remove 4 screws from the back case
3. Locate Diode D502. It is located behind the number 3 key on the keypad.
4. **Cut the exposed lead of D502** and push the ends apart.
5. **Install a Diode in the empty location D-501.** (Speed Increase)
6. Reassemble the radio.



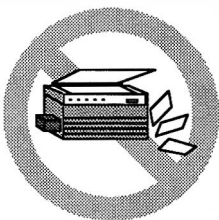
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW.  
HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications.  
If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## RADIO SHACK PRO-2006

### EXPANDED RF (800MHz) SCAN SPEED INCREASE.

1. Remove Power and Antenna.
2. Remove screws from the case
3. Locate Diode D502. It is located behind the number 3 key on the keypad.
4. **Cut the exposed lead of Diode D502** and push the ends apart.
5. **Cut Diode D-503.** (15 Percent speed increase.)
5. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

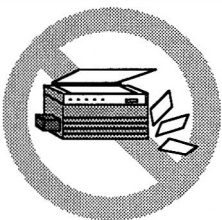
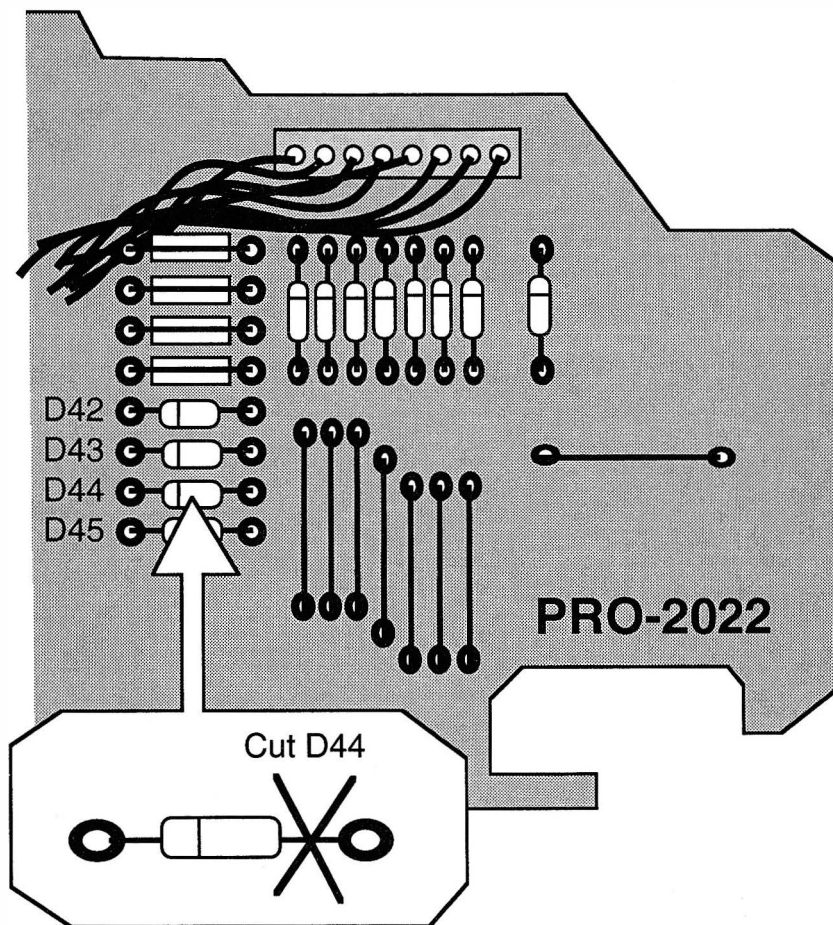
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# RADIO SHACK PRO-2022

## EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove screws from the case
3. Locate and **cut Diode D44**.
4. Reassemble the radio.



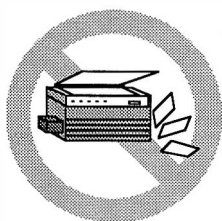
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## RADIO SHACK PRO-2026

EXPANDED RF (800MHz)  
(30kHz Spacing)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case.
3. Remove covers.
4. Locate the small circuit board near the lower right-hand corner.
5. Locate and **cut Silver Wire jumper L201**.
6. Reassemble the radio.



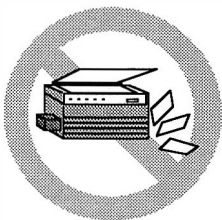
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## RADIO SHACK PRO-33

### Scan speed increase

1. Remove Power and Antenna.
2. Remove screws from the case
3. Locate LOGIC circuit board.
4. Locate and **cut Diode D11**
5. Reassemble the radio.



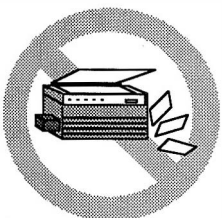
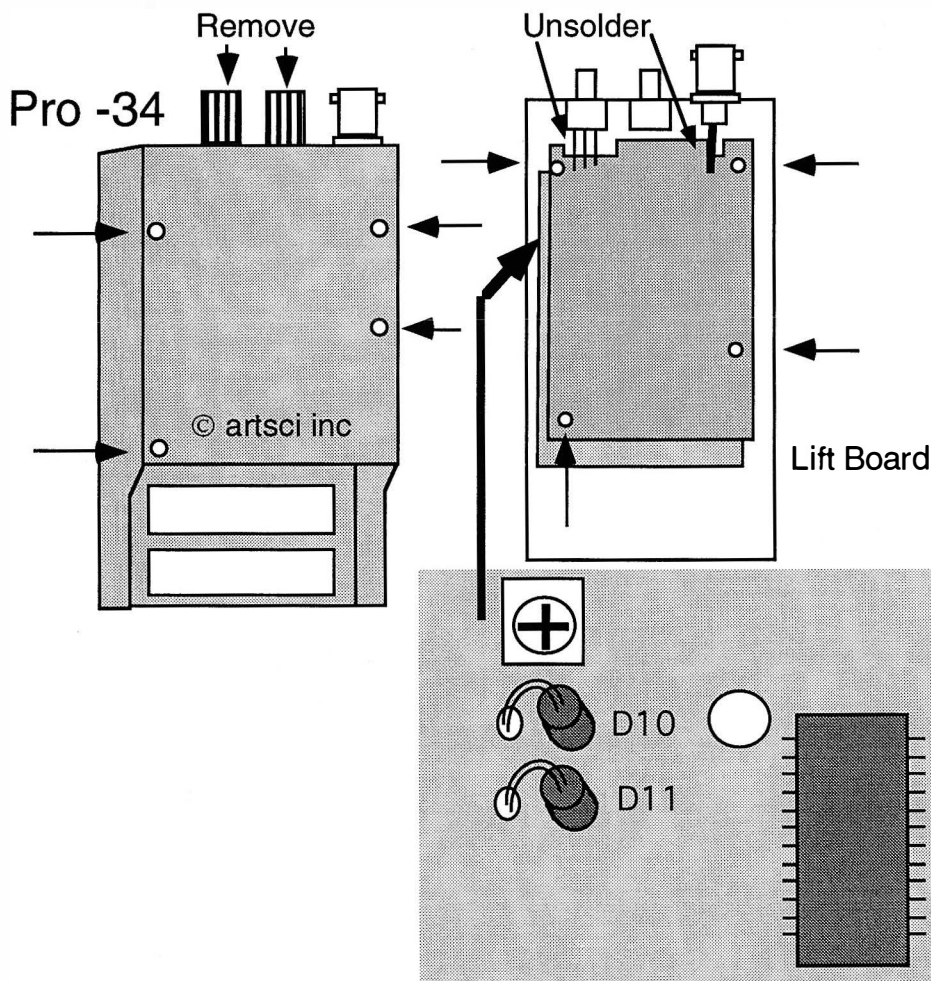
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## RADIO SHACK PRO-34

### 800 MHZ Expansion

1. Remove battery and Antenna.
2. Remove 4 screws from the case.
3. Remove Volume and Squelch Knobs.
4. Unsnap and remove back cover.
5. Remove 4 hex screws holding top board.
6. Unsolder BNC center pin & two wires on volume control.  
An additional ground wire on bottom of board to metal shield may need to be removed.
7. Unplug circuit board and move away.
8. Remove 3 screws on metal cover plate and remove.
9. Locate and **cut Diode D11** on Logic board.
5. Reassemble the radio.



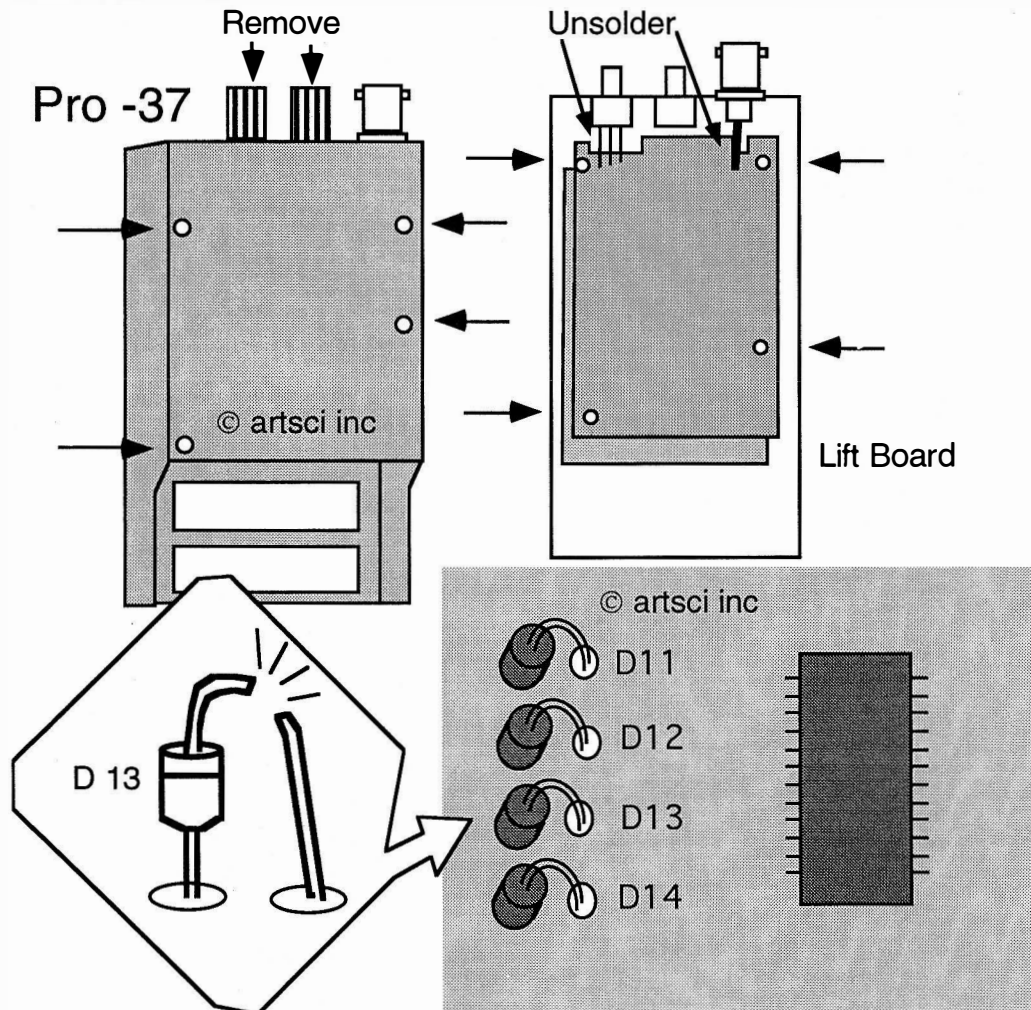
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# RADIO SHACK PRO-37

## 800 MHZ Expansion

1. Remove batteries and Antenna.
2. Remove Knobs.
3. Remove the 4 body screws.
4. Slide Case off. (over Vol & Squelch posts)
5. Unsolder BNC Connector. You may wish to unsolder the 3 wires to the control pot.
6. Unscrew 4 "Hex/Nuts Posts" holding upper board.
7. Unplug upper board.
8. Remove 3 shield screws and lift the shield.
9. **Clip Diode D13.**
10. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

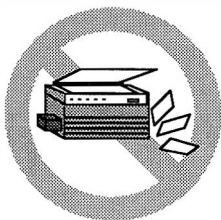
## RADIO SHACK PRO-39

800 MHZ Expansion  
30kHz steps only.

1. Remove batteries and Antenna.
2. Remove 4 screws from the back of the scanner.
3. Carefully lift the scanners back cover off.
4. Unplug the 2 wire harness.
5. Remove the 6 screws holding the circuit board in place.
6. Unsolder the ground wire at the bottom of the board.
7. Unsolder the BNC connector.
8. Lift the board and set it aside.
9. Remove the two screws holding the next circuit board.
10. Unplug the 2 wire connector.
11. Lift the board and set it aside.
12. Unsolder the shield and set it aside.
13. Locate and **cut diode D6**.
14. Reassemble the scanner.

### OTHER DIODE Modifications:

- D4 - Enable 68-88 MHz coverage (lose 30-54 MHz coverage)
- D5 - Enables 800 MHz operation
- D7 - Enable 12.5 kHz spacing. (Not good for cellular)



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

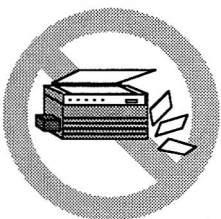
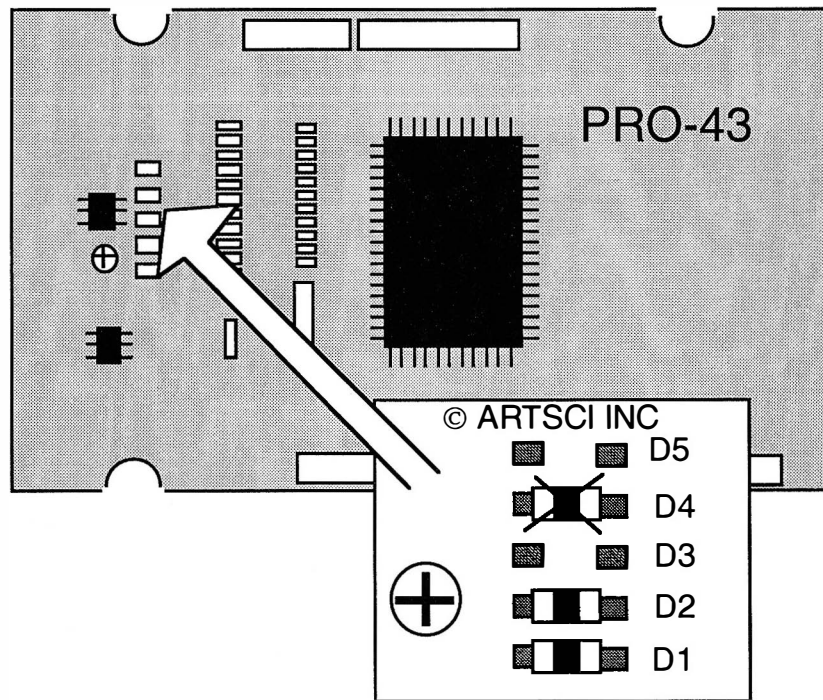
© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

# RADIO SHACK PRO-43

## 800 MHZ Expansion

1. Remove battery and Antenna.
2. Remove the four screws from the back case & gently remove the case.
3. Unsolder the BNC connector from the top board.
4. Remove six screws from the top board.
5. Disconnect the two connectors near the shielded area.
6. Gently lift the top board and set it aside.
7. Remove the two screws securing the middle board.
8. Lift the board and set it aside. (Do not disconnect it from the bottom board.)
9. Unsolder the four corners of the shield and remove it.
10. Locate the surface diodes under the CPU.
11. Locate and **remove D4**. Do not crush the part. Unsolder and remove it.
12. Reassemble the radio.

NOTE: PLACING A DIODE IN POSITION D3 MAY INCREASE LOW BAND COVERAGE FROM 54 TO 88 MHZ



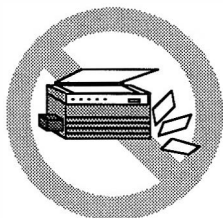
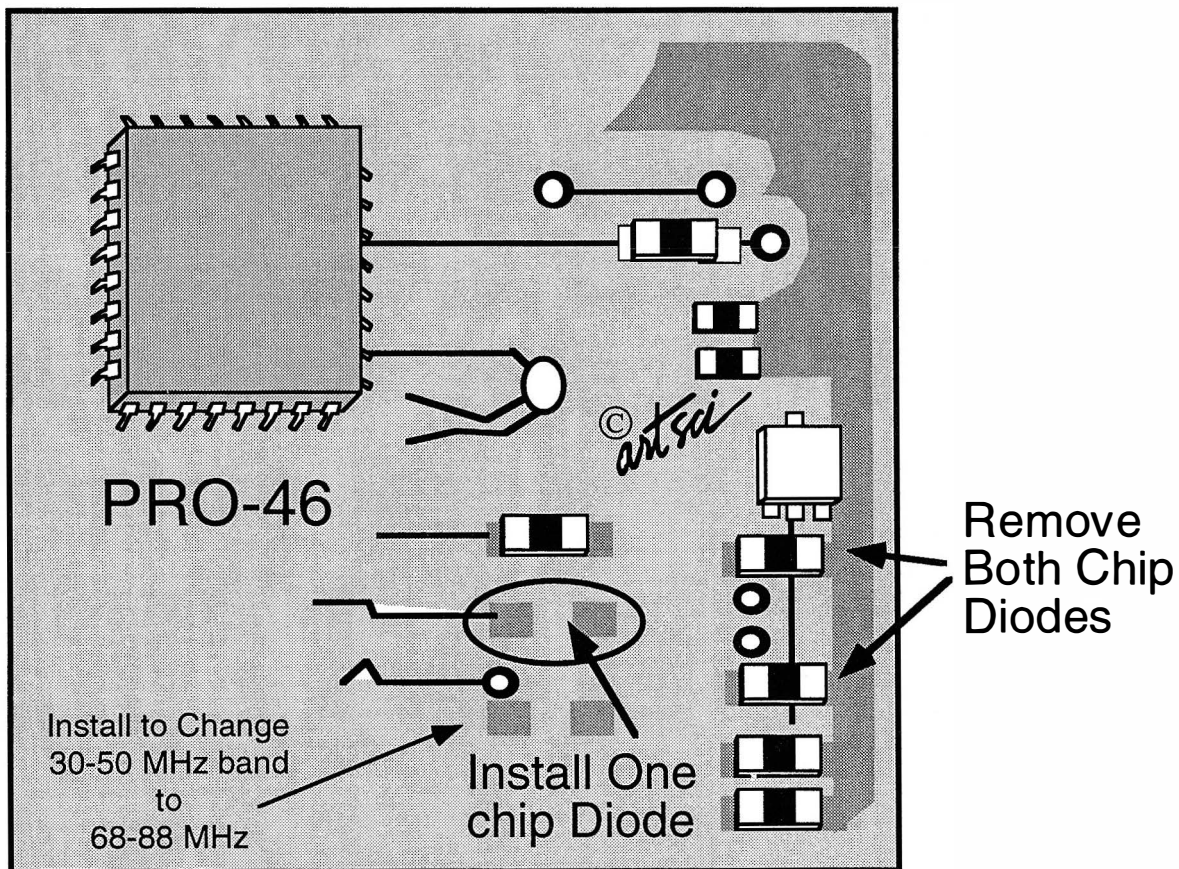
PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298

## RADIO SHACK PRO-46

800 MHz Expansion  
(with 30 kHz steps)

1. Remove battery and Antenna.
2. Remove the four screws from the back case & gently remove the case.
3. Unplug the upper board from the lower board.
4. Unsolder the copper/Plastic shield from the microprocessor.
5. Locate and **remove the two 0 ohm chip resistors**. (see drawing)
6. Solder **install one of the chip resistors** as shown. (upper pad)
7. Reassemble the radio.



PHOTOCOPIES OF THESE PAGES ARE A VIOLATION OF COPYRIGHT LAW. HAVE THE ORIGINAL BOOK WITH YOU if you call with a question. Use of any modified radio may be a violation of FCC rules. Some modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

© artsci inc. all rights reserved. (818) 843-4080 Fax: (818) 846-2298



# Performance Report

Radio \_\_\_\_\_

Date \_\_\_\_\_

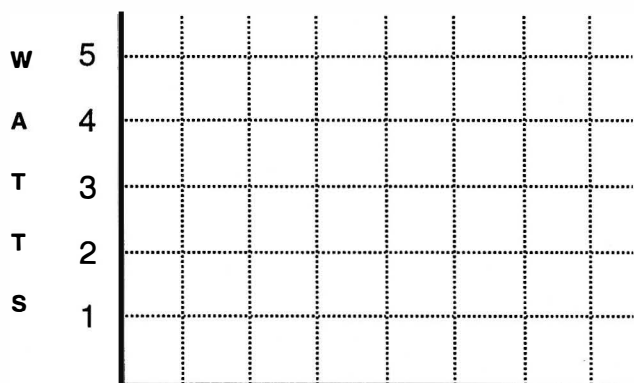
Owner : Name \_\_\_\_\_

Address \_\_\_\_\_

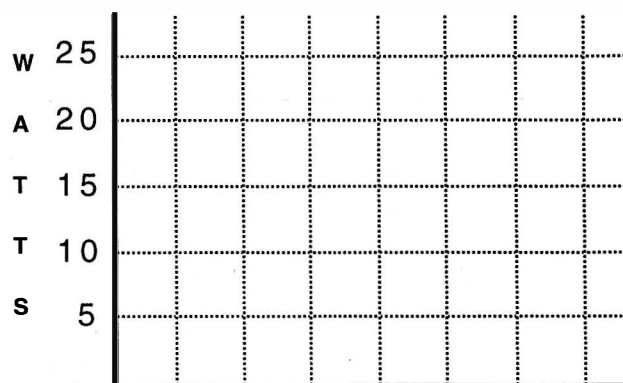
City \_\_\_\_\_ St. \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) - \_\_\_\_\_

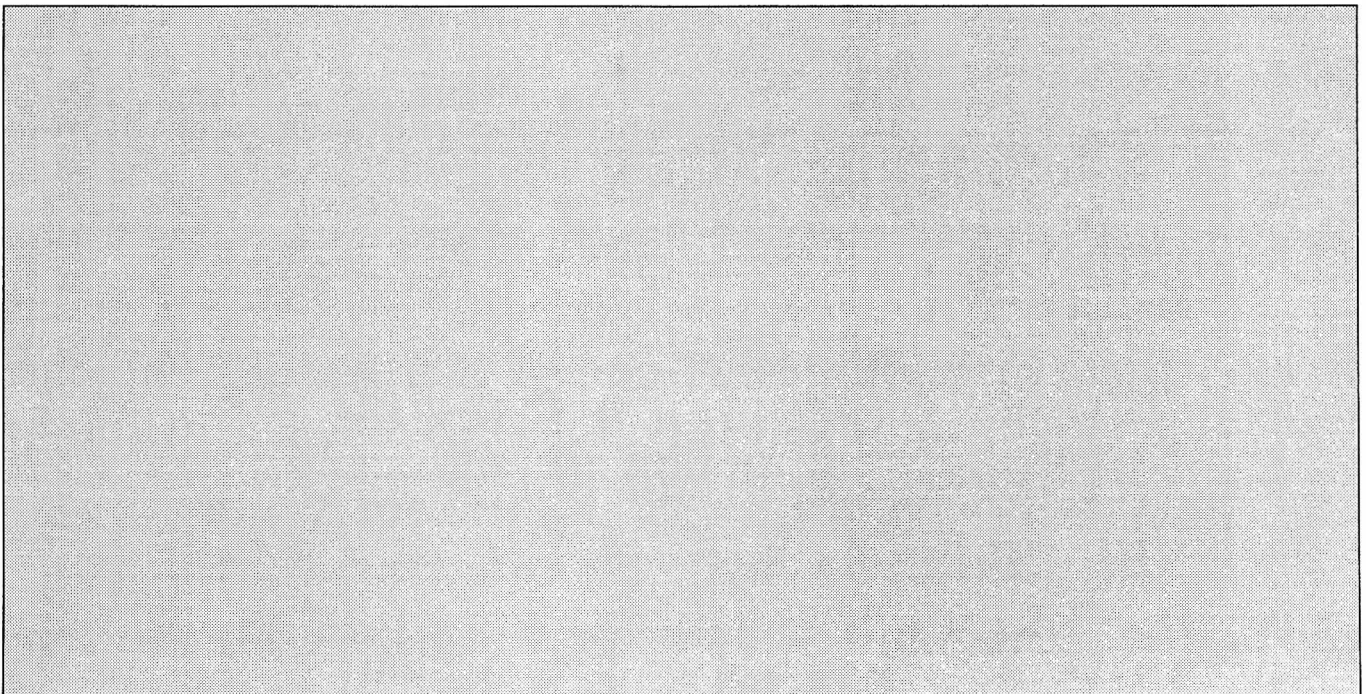
| Description                    | Before      | After       |
|--------------------------------|-------------|-------------|
| Power out (Low)                | _____ Watts | _____ Watts |
| Power out (High)               | _____ Watts | _____ Watts |
| Frequency Error (Simplex)      | _____ Hz    | _____ Hz    |
| Frequency Error (Offset)       | _____ Hz    | _____ Hz    |
| Receive Sensitivity (Mid-band) | _____ uv    | _____ uv    |
| Receive Sensitivity (____ MHz) | _____ uv    | _____ uv    |
| Receive Sensitivity (____ MHz) | _____ uv    | _____ uv    |
| PL Deviation                   | _____ Hz    | _____ Hz    |
| DTMF Deviation                 | _____ KHz   | _____ KHz   |
| Audio Deviation                | _____ KHz   | _____ KHz   |
| Lowest usable Freq @ .5 Pwr    | _____ MHz   | _____ MHz   |
| Highest usable Freq @ .5 Pwr   | _____ MHz   | _____ MHz   |



Frequency



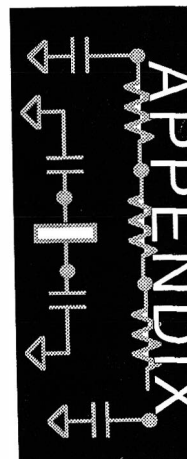
Frequency

[illegible]

# Radio / Tech Modifications

## APPENDIX

| <b>Page</b> | <b>#</b> | <b>Description</b>                    | <b>]</b> |
|-------------|----------|---------------------------------------|----------|
| A           |          | Coax loss chart, db attenuation chart |          |
| B           |          | Resistor, Capacitor color codes       |          |
| C           |          | PL Encoder Hook up.                   |          |
| D           |          | PL tone chart, CMOS-TTL schematic     |          |
| E           |          | PL Decoder hook up 1                  |          |
| F           |          | PL Decoder hook up 2                  |          |
| G           |          | Memory channel assignments            |          |



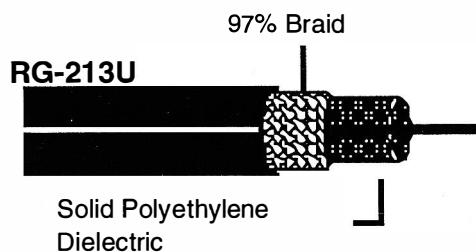
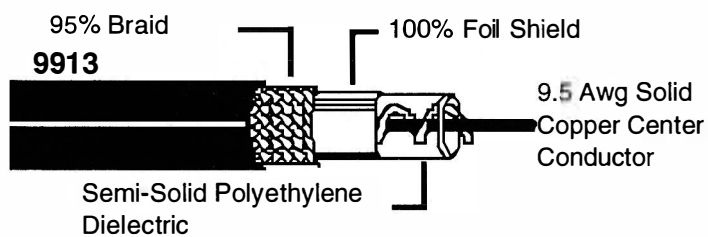
| COAX TYPE               | VEL % | dB ATTENUATION<br>PER 100 FEET. |            |            |             | LENGTH IN FEET<br>FOR 1 WAVELENGTH |            |            |
|-------------------------|-------|---------------------------------|------------|------------|-------------|------------------------------------|------------|------------|
|                         |       | 100<br>MHz                      | 200<br>MHz | 400<br>MHz | 1000<br>MHz | 146<br>MHz                         | 222<br>MHz | 445<br>MHz |
| 9913 (100% shield)      | 89    | 1.4                             | 1.8        | 2.6        | 4.5         | 6.00                               | 3.94       | 1.97       |
| RG-8U FOAM (8214)       | 80    | 1.8                             | 2.7        | 4.2        | 7.0         | 5.39                               | 3.55       | 1.77       |
| RG-213 (NON-CONTAM.)    | 66    | 2.2                             | 3.2        | 4.7        | 8.5         | 4.45                               | 2.93       | 1.46       |
| RG-8X (MINI-FOAM)       | 78    | 3.7                             | 5.4        | 8.0        | 13.5        | 5.26                               | 3.46       | 1.72       |
| 9311 (100% SHIELD 58U)  | 78    | 4.5                             | 6.3        | 9.0        | 14.5        | 5.26                               | 3.46       | 1.72       |
| RG-58U (SOLID CENTER)   | 66    | 4.5                             | 6.7        | 10.0       | 17.0        | 4.45                               | 2.93       | 1.46       |
| RG-58A/U (STRANDED CTR) | 66    | 4.9                             | 7.5        | 11.5       | 21.5        | 4.45                               | 2.93       | 1.46       |

(c) 1989 N6MOS

COAX LENGTHS SHOULD BE MULTIPLE HALF WAVELENGTHS.

$$\frac{984}{\text{FREQ. IN MHZ}} \times \text{VEL \%} = \text{ONE WAVE LENGTH IN FEET.}$$

| db - % loss chart |            |         |            |         |            |         |            |
|-------------------|------------|---------|------------|---------|------------|---------|------------|
| db Loss           | Power Loss | db Loss | Power Loss | db Loss | Power Loss | db Loss | Power Loss |
| 0.2               | 4 %        | 2.0     | 37 %       | 4.0     | 60 %       | 6.0     | 75 %       |
| 0.4               | 8 %        | 2.2     | 39 %       | 4.2     | 62 %       | 7.0     | 80 %       |
| 0.6               | 13 %       | 2.4     | 42 %       | 4.4     | 63 %       | 8.0     | 84 %       |
| 0.8               | 17 %       | 2.6     | 45 %       | 4.6     | 65 %       | 9.0     | 87 %       |
| 1.0               | 21 %       | 2.8     | 47 %       | 4.8     | 67 %       | 10.0    | 90 %       |
| 1.2               | 24 %       | 3.0     | 50 %       | 5.0     | 68 %       | 20.0    | 99 %       |
| 1.4               | 27 %       | 3.2     | 52 %       | 5.2     | 70 %       | 30.0    | 100 %      |
| 1.6               | 30 %       | 3.4     | 54 %       | 5.4     | 71 %       | 40.0    | 100 %      |
| 1.8               | 33 %       | 3.6     | 56 %       | 5.6     | 73 %       |         |            |
|                   |            | 3.8     | 58 %       | 5.8     | 74 %       |         |            |



## APPENDIX A

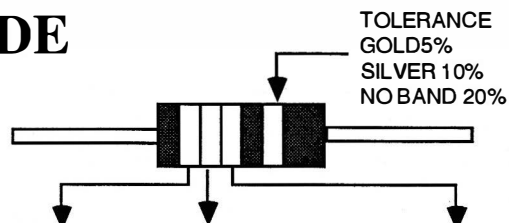
# RESISTOR COLOR CODE

**Example**



BROWN 1  
BLACK 0  
YELLOW 10,000  
SILVER 10%

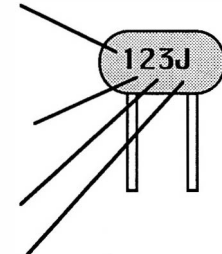
$10 \times 10,000 = 100,000$   
(100K) OHMS



| COLOR  | 1st DIGIT | 2nd DIGIT | MULTIPLY BY   |
|--------|-----------|-----------|---------------|
| BLACK  | 0         | 0         | 1             |
| BROWN  | 1         | 1         | 10            |
| RED    | 2         | 2         | 100           |
| ORANGE | 3         | 3         | 1,000         |
| YELLOW | 4         | 4         | 10,000        |
| GREEN  | 5         | 5         | 100,000       |
| BLUE   | 6         | 6         | 1,000,000     |
| VIOLET | 7         | 7         | 10,000,000    |
| GRAY   | 8         | 8         | 100,000,000   |
| WHITE  | 9         | 9         | 1,000,000,000 |
| GOLD   |           |           | .1            |
| SILVER |           |           | .01           |

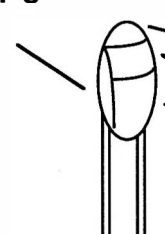
## CAPACITORS

1ST DIGIT OF CAP. VALUE  
2ND DIGIT OF CAP. VALUE  
MULTIPLIER  
TOLERANCE



| MULTIPLIER |             | TOLERANCE |              |           |
|------------|-------------|-----------|--------------|-----------|
|            | MULTIPLY BY |           | 10pF or less | over 10pF |
| 0          | 1           | B         | 0.1pF        |           |
| 1          | 10          | C         | 0.25pF       |           |
| 2          | 100         | D         | 0.5pF        |           |
| 3          | 1,000       | F         | 1.0pf        | 1%        |
| 4          | 10,000      | G         | 2.0pf        | 2%        |
| 5          | 100,000     | H         |              | 3%        |
|            |             | J         |              | 5%        |
| 8          | .01         | K         |              | 10%       |
| 9          | 0.1         | M         |              | 20%       |

POLARITY & VOLTAGE

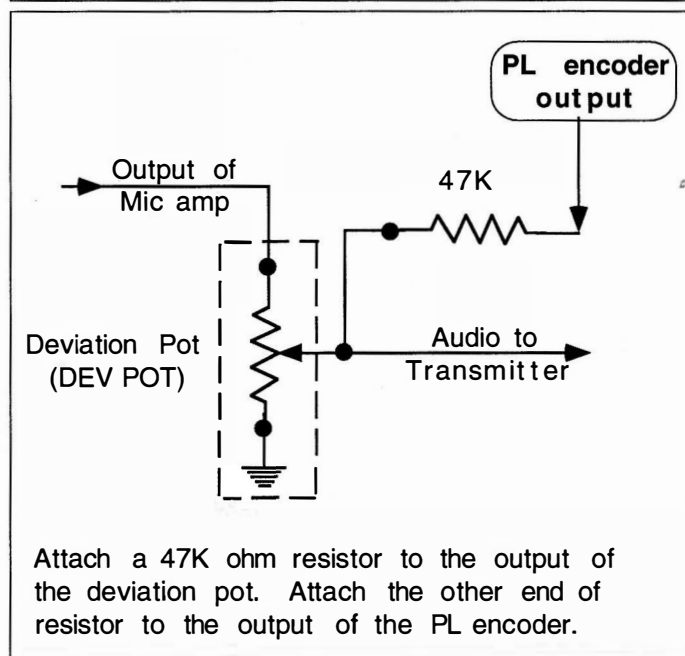


1ST DIGIT  
2ND DIGIT  
MULTIPLIER

| COLOR  | DIGIT | MULTIPLIER | VOLTAGE |
|--------|-------|------------|---------|
| BLACK  | 0     | NONE       | 4       |
| BROWN  | 1     | 10         | 6       |
| RED    | 2     | 100        | 10      |
| ORANGE | 3     | 1,000      | 15      |
| YELLOW | 4     | 10,000     | 20      |
| GREEN  | 5     | 100,000    | 25      |
| BLUE   | 6     | 1,000,000  | 35      |
| VIOLET | 7     | 10,000,000 | 50      |
| GRAY   | 8     |            |         |
| WHITE  | 9     |            |         |

# PL ENCODER HOOK-UP

## PL Encoder Connections

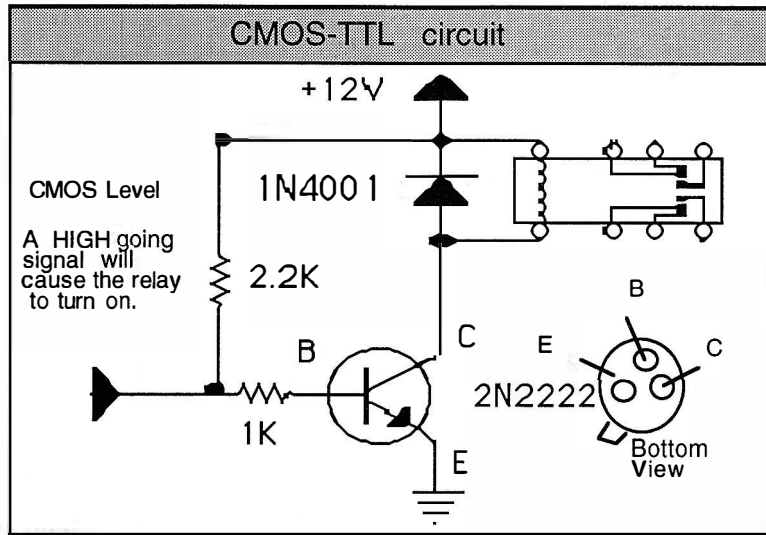


## PL TONE CHART

| PL TONE | FREQ. CODE | ICOM | YAESU | TS-32 SWITCH |   |   |   |   |
|---------|------------|------|-------|--------------|---|---|---|---|
|         |            |      |       | 1            | 2 | 3 | 4 | 5 |
| 67.0    | -XZ        | 1    | 1     | 1            | 1 | 1 | 1 | 1 |
| 71.9    | -XA        | 2    | 2     | 0            | 1 | 1 | 1 | 1 |
| 74.4    | -WA        | 3    | 36    | 1            | 0 | 1 | 1 | 1 |
| 77.0    | -XB        | 4    | 3     | 0            | 0 | 1 | 1 | 1 |
| 79.7    | -SP        | 5    | 38    | 1            | 1 | 0 | 1 | 1 |
| 82.5    | -YZ        | 6    | 4     | 0            | 1 | 0 | 1 | 1 |
| 85.4    | -YA        | 7    | 40    | 1            | 0 | 0 | 1 | 1 |
| 88.5    | -YB        | 8    | 5     | 0            | 0 | 0 | 1 | 1 |
| 91.5    | -ZZ        | 9    | 42    | 1            | 1 | 1 | 0 | 1 |
| 94.8    | -ZA        | 10   | 6     | 0            | 1 | 1 | 0 | 1 |
| 97.4    | -ZB        | 11   |       | 1            | 0 | 1 | 0 | 1 |
| 100.0   | -1Z        | 12   | 7     | 0            | 0 | 1 | 0 | 1 |
| 103.5   | -1A        | 13   | 8     | 1            | 1 | 0 | 0 | 1 |
| 107.2   | -1B        | 14   | 9     | 0            | 1 | 0 | 0 | 1 |
| 110.9   | -2Z        | 15   | 10    | 1            | 0 | 0 | 0 | 1 |
| 114.8   | -2A        | 16   | 11    | 0            | 0 | 0 | 0 | 1 |
| 118.8   | -2B        | 17   | 12    | 1            | 1 | 1 | 1 | 0 |
| 123.0   | -3Z        | 18   | 13    | 0            | 1 | 1 | 1 | 0 |
| 127.3   | -3A        | 19   | 14    | 1            | 0 | 1 | 1 | 0 |
| 131.8   | -3B        | 20   | 15    | 0            | 0 | 1 | 1 | 0 |
| 136.5   | -4Z        | 21   | 16    | 1            | 1 | 0 | 1 | 0 |
| 141.3   | -4A        | 22   | 17    | 0            | 1 | 0 | 1 | 0 |
| 146.3   | -4B        | 23   | 18    | 1            | 0 | 0 | 1 | 0 |
| 151.4   | -5Z        | 24   | 19    | 0            | 0 | 0 | 1 | 0 |
| 156.7   | -5A        | 25   | 20    | 1            | 1 | 1 | 0 | 0 |
| 162.2   | -5B        | 26   | 21    | 0            | 1 | 1 | 0 | 0 |
| 167.9   | -6Z        | 27   | 22    | 1            | 0 | 1 | 0 | 0 |
| 173.8   | -6A        | 28   | 23    | 0            | 0 | 1 | 0 | 0 |
| 179.9   | -6B        | 29   | 24    | 1            | 1 | 0 | 0 | 0 |
| 186.2   | -7Z        | 30   | 25    | 0            | 1 | 0 | 0 | 0 |
| 192.8   | -7A        | 31   | 26    | 1            | 0 | 0 | 0 | 0 |
| 203.5   | -M1        | 32   | 27    | 0            | 0 | 0 | 0 | 0 |
| 210.7   |            | 33   |       |              |   |   |   |   |

1 = on / 2 = off  
example above  
01001=107.2

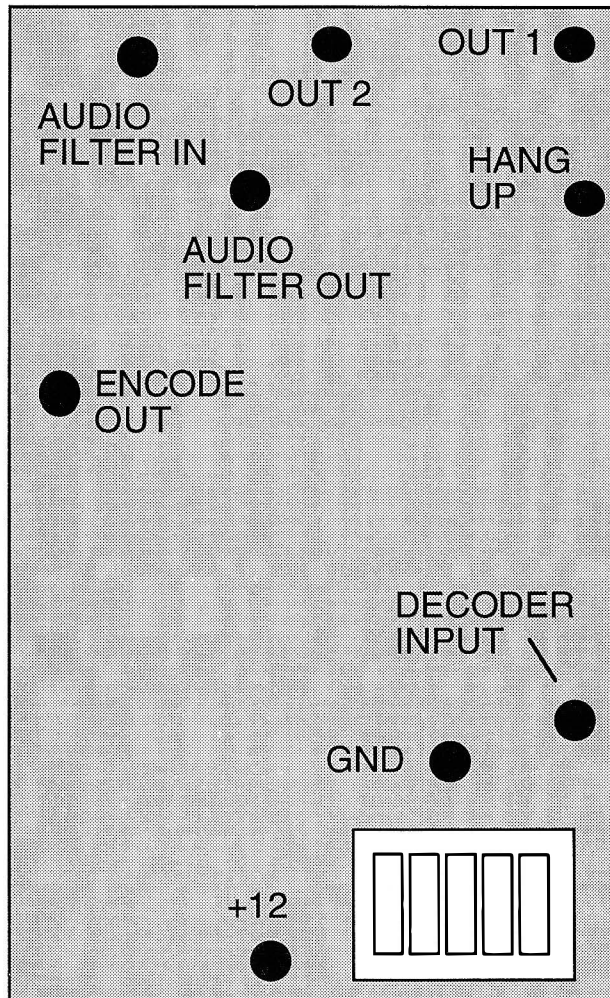
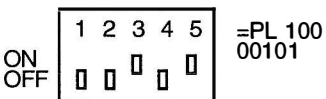




| Freq. | 1 | 2 | 3 | 4 | 5 | Code | #  |
|-------|---|---|---|---|---|------|----|
| 67.0  | 1 | 1 | 1 | 1 | 1 | XZ   | 1  |
| 71.9  | 0 | 1 | 1 | 1 | 1 | XA   | 2  |
| 74.4  | 1 | 0 | 1 | 1 | 1 | WA   | 3  |
| 77.0  | 0 | 0 | 1 | 1 | 1 | XB   | 4  |
| 79.7  | 1 | 1 | 0 | 1 | 1 | SP   | 5  |
| 82.5  | 0 | 1 | 0 | 1 | 1 | YZ   | 6  |
| 85.4  | 1 | 0 | 0 | 1 | 1 | YA   | 7  |
| 88.5  | 0 | 0 | 0 | 1 | 1 | YB   | 8  |
| 91.5  | 1 | 1 | 1 | 0 | 1 | ZZ   | 9  |
| 94.8  | 0 | 1 | 1 | 0 | 1 | ZA   | 10 |
| 97.4  | 1 | 0 | 1 | 0 | 1 | ZB   | 11 |
| 100.0 | 0 | 0 | 1 | 0 | 1 | 1Z   | 12 |
| 103.5 | 1 | 1 | 0 | 0 | 1 | 1A   | 13 |
| 107.2 | 0 | 1 | 0 | 0 | 1 | 1B   | 14 |
| 110.9 | 1 | 0 | 0 | 0 | 1 | 2Z   | 15 |
| 114.8 | 0 | 0 | 0 | 0 | 1 | 2A   | 16 |
| 118.8 | 1 | 1 | 1 | 1 | 0 | 2B   | 17 |
| 123.0 | 0 | 1 | 1 | 1 | 0 | 3Z   | 18 |
| 127.3 | 1 | 0 | 1 | 1 | 0 | 3A   | 19 |
| 131.8 | 0 | 0 | 1 | 1 | 0 | 3B   | 20 |
| 136.5 | 1 | 1 | 0 | 1 | 0 | 4Z   | 21 |
| 141.3 | 0 | 1 | 0 | 1 | 0 | 4A   | 22 |
| 146.2 | 1 | 0 | 0 | 1 | 0 | 4B   | 23 |
| 151.4 | 0 | 0 | 0 | 1 | 0 | 5Z   | 24 |
| 156.7 | 1 | 1 | 1 | 0 | 0 | 5A   | 25 |
| 162.2 | 0 | 1 | 1 | 0 | 0 | 5B   | 26 |
| 167.9 | 1 | 0 | 1 | 0 | 0 | 6Z   | 27 |
| 173.8 | 0 | 0 | 1 | 0 | 0 | 6A   | 28 |
| 179.9 | 1 | 1 | 0 | 0 | 0 | 6B   | 29 |
| 186.2 | 0 | 1 | 0 | 0 | 0 | 7Z   | 30 |
| 192.8 | 1 | 0 | 0 | 0 | 0 | 7A   | 31 |
| 203.5 | 0 | 0 | 0 | 0 | 0 | M1   | 32 |

| Freq. | 1 | 2 | 3 | 4 | 5 | Code | #  |
|-------|---|---|---|---|---|------|----|
| 67.0  | 1 | 1 | 1 | 1 | 1 | XZ   | 1  |
| 71.9  | 0 | 1 | 1 | 1 | 1 | XA   | 2  |
| 74.4  | 1 | 0 | 1 | 1 | 1 | WA   | 3  |
| 77.0  | 0 | 0 | 1 | 1 | 1 | XB   | 4  |
| 79.7  | 1 | 1 | 0 | 1 | 1 | SP   | 5  |
| 82.5  | 0 | 1 | 0 | 1 | 1 | YZ   | 6  |
| 85.4  | 1 | 0 | 0 | 1 | 1 | YA   | 7  |
| 88.5  | 0 | 0 | 0 | 1 | 1 | YB   | 8  |
| 91.5  | 1 | 1 | 1 | 0 | 1 | ZZ   | 9  |
| 94.8  | 0 | 1 | 1 | 0 | 1 | ZA   | 10 |
| 97.4  | 1 | 0 | 1 | 0 | 1 | ZB   | 11 |
| 100.0 | 0 | 0 | 1 | 0 | 1 | 1Z   | 12 |
| 103.5 | 1 | 1 | 0 | 0 | 1 | 1A   | 13 |
| 107.2 | 0 | 1 | 0 | 0 | 1 | 1B   | 14 |
| 110.9 | 1 | 0 | 0 | 0 | 1 | 2Z   | 15 |
| 114.8 | 0 | 0 | 0 | 0 | 1 | 2A   | 16 |
| 118.8 | 1 | 1 | 1 | 1 | 0 | 2B   | 17 |
| 123.0 | 0 | 1 | 1 | 1 | 0 | 3Z   | 18 |
| 127.3 | 1 | 0 | 1 | 1 | 0 | 3A   | 19 |
| 131.8 | 0 | 0 | 1 | 1 | 0 | 3B   | 20 |
| 136.5 | 1 | 1 | 0 | 1 | 0 | 4Z   | 21 |
| 141.3 | 0 | 1 | 0 | 1 | 0 | 4A   | 22 |
| 146.2 | 1 | 0 | 0 | 1 | 0 | 4B   | 23 |
| 151.4 | 0 | 0 | 0 | 1 | 0 | 5Z   | 24 |
| 156.7 | 1 | 1 | 1 | 0 | 0 | 5A   | 25 |
| 162.2 | 0 | 1 | 1 | 0 | 0 | 5B   | 26 |
| 167.9 | 1 | 0 | 1 | 0 | 0 | 6Z   | 27 |
| 173.8 | 0 | 0 | 1 | 0 | 0 | 6A   | 28 |
| 179.9 | 1 | 1 | 0 | 0 | 0 | 6B   | 29 |
| 186.2 | 0 | 1 | 0 | 0 | 0 | 7Z   | 30 |
| 192.8 | 1 | 0 | 0 | 0 | 0 | 7A   | 31 |
| 203.5 | 0 | 0 | 0 | 0 | 0 | M1   | 32 |

1 (ON) CLOSED  
0 (OFF) OPEN



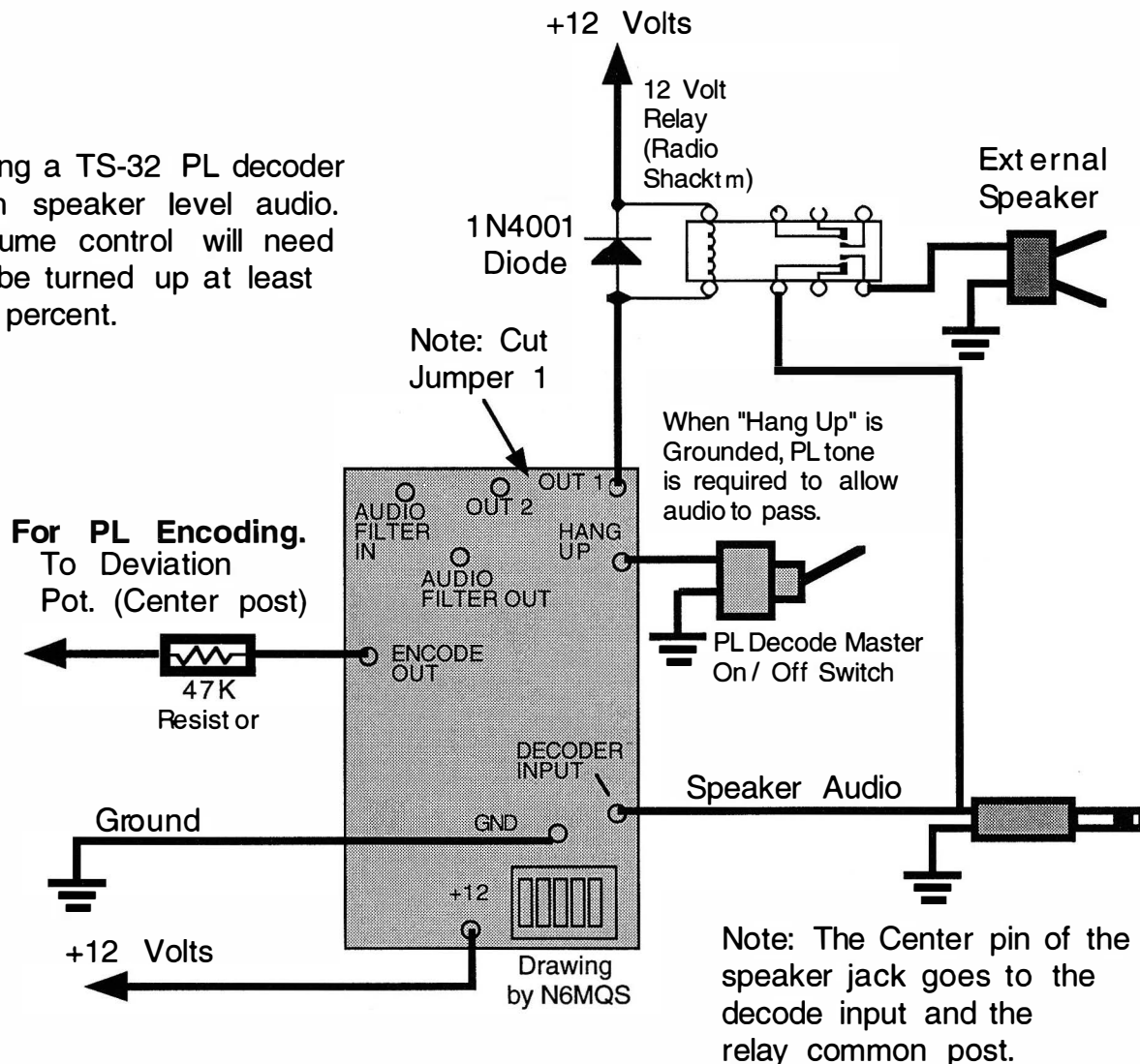
**TS-32**  
**LAYOUT**

# TS-32 HOOKUP

## PL Decoder

WHEN THE SELECTED PL TONE IS RECEIVED, THE RELAY WILL CLOSE AND AUDIO WILL BE PASSED TO THE SPEAKER.

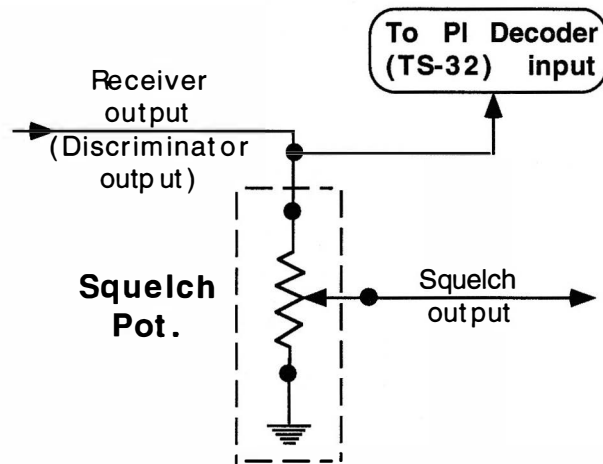
Using a TS-32 PL decoder with speaker level audio. Volume control will need to be turned up at least 40 percent.





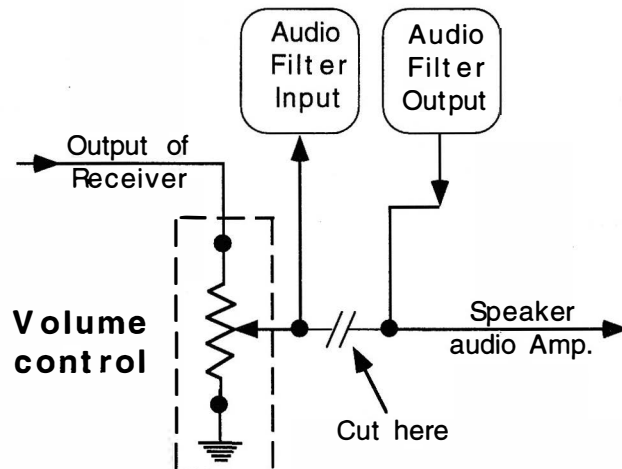
# PL DECODER HOOK-UP

## PL Decoder Connections



Attach a wire to the discriminator output. Attach the other end to the decoder input. The discriminator output is often connected to the squelch pot. See audio connections below for audio control.

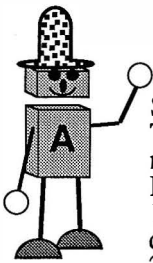
## PL Decoder/ Audio Connections



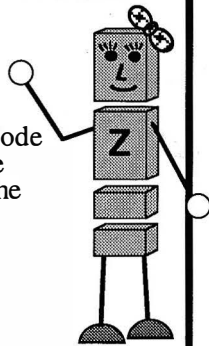
Audio muting is controlled by the TS-32 Board. When a PL is present on the signal, audio will pass.

| ## | FREQ. | DESCRIPTION | HAN | ##  | FREQ. | DESCRIPTION |
|----|-------|-------------|-----|-----|-------|-------------|
| 1  |       |             |     | 51  |       |             |
| 2  |       |             |     | 52  |       |             |
| 3  |       |             |     | 53  |       |             |
| 4  |       |             |     | 54  |       |             |
| 5  |       |             |     | 55  |       |             |
| 6  |       |             |     | 56  |       |             |
| 7  |       |             |     | 57  |       |             |
| 8  |       |             |     | 58  |       |             |
| 9  |       |             |     | 59  |       |             |
| 10 |       |             |     | 60  |       |             |
| 11 |       |             |     | 61  |       |             |
| 12 |       |             |     | 62  |       |             |
| 13 |       |             |     | 63  |       |             |
| 14 |       |             |     | 64  |       |             |
| 15 |       |             |     | 65  |       |             |
| 16 |       |             |     | 66  |       |             |
| 17 |       |             |     | 67  |       |             |
| 18 |       |             |     | 68  |       |             |
| 19 |       |             |     | 69  |       |             |
| 20 |       |             |     | 70  |       |             |
| 21 |       |             |     | 71  |       |             |
| 22 |       |             |     | 72  |       |             |
| 23 |       |             |     | 73  |       |             |
| 24 |       |             |     | 74  |       |             |
| 25 |       |             |     | 75  |       |             |
| 26 |       |             |     | 76  |       |             |
| 27 |       |             |     | 77  |       |             |
| 28 |       |             |     | 78  |       |             |
| 29 |       |             |     | 79  |       |             |
| 30 |       |             |     | 80  |       |             |
| 31 |       |             |     | 81  |       |             |
| 32 |       |             |     | 82  |       |             |
| 33 |       |             |     | 83  |       |             |
| 34 |       |             |     | 84  |       |             |
| 35 |       |             |     | 85  |       |             |
| 36 |       |             |     | 86  |       |             |
| 37 |       |             |     | 87  |       |             |
| 38 |       |             |     | 88  |       |             |
| 39 |       |             |     | 89  |       |             |
| 40 |       |             |     | 90  |       |             |
| 41 |       |             |     | 91  |       |             |
| 42 |       |             |     | 92  |       |             |
| 43 |       |             |     | 93  |       |             |
| 44 |       |             |     | 94  |       |             |
| 45 |       |             |     | 95  |       |             |
| 46 |       |             |     | 96  |       |             |
| 47 |       |             |     | 97  |       |             |
| 48 |       |             |     | 98  |       |             |
| 49 |       |             |     | 99  |       |             |
| 50 |       |             |     | 100 |       |             |

## RIDING THE AIRWAVES WITH ALPHA & ZULU



Study for the Novice and No-Code Technician license tests with the newest comic book characters the Phonetics. 112 comic strips review all the questions and answers. 288 pages, 8 1/2 X 11" format

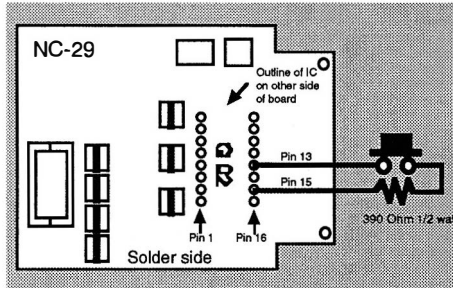


## RADIO/TECH MODIFICATIONS # 6A

Modifications and alignment controls for ICOM & KENWOOD amateur radios, and UNIDEN, RADIO SHACK & REGENCY Scanners. Over 200 pages, 8 1/2" X 11"

## RADIO/TECH MODIFICATIONS # 6B

Modifications and alignment controls for ALINCO, YAESU, STANDARD, AZDEN radios and 10 meter & CB radios.



## U.S. REPEATER MAPBOOK #2

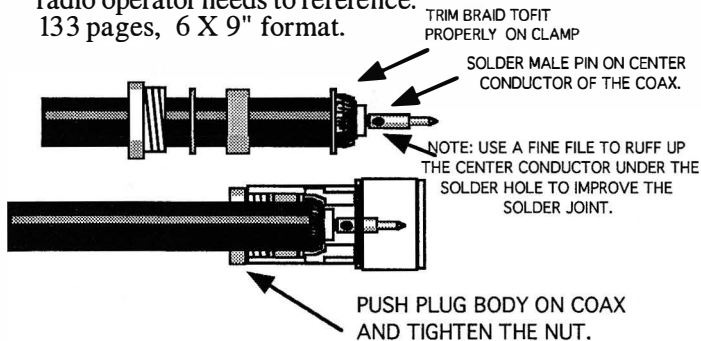
A repeater guide that shows where in each state principal open amateur repeaters are located. The Maps also show the important highways in each state. Tables showing the popular repeater in the states major cities are also presented. 2 meter, 200, 440 MHz and 1.2 GHz repeaters are shown. 144 pages, 6 x 9" format

## FEDERAL ASSIGNMENTS Vol 3

The Frequency assignment master file. The complete listing of all U.S. government used frequencies listed by agency and in frequency order. Frequencies for Departments of: Agriculture, Air Force, Army, Commerce, Defence, Energy, Health and Human Services, Housing and Urban Development, Interior, Justice, Labor, Navy, State, Treasury, Transportation and 29 Independent agencies & Commissions. Over 350 pages, 8 1/2 X 11" format

## AMATEUR HAMBOOK

Equipment & Log Sheets, Charts, Tables showing: worldwide call signs, world times, shortwave listening frequencies, coax losses, CTCSS details, conversions, construction plans, emergency information, etc. This book contains all the useful information a amateur radio operator needs to reference. 133 pages, 6 X 9" format.



## QUICK-N-EASY SHORTWAVE LISTENING

What kind of radio to Buy? Whats a good antenna, What is there to listen to? This book contains pictures of radios, antenna construction and frequency lists. 6 X 9" format

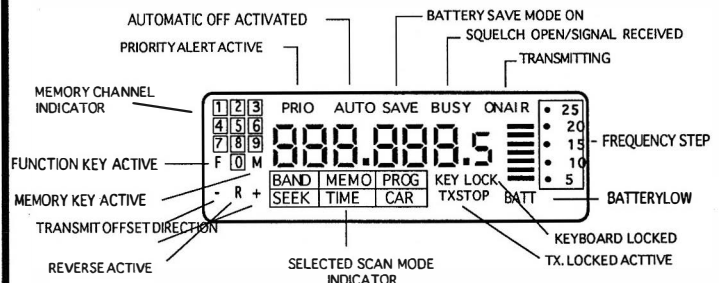
## HAM RADIO RESOURCE GUIDE

For Southern California only. A booklet of all the information an amateur radio operator needs. Listings of clubs, testing centers, radio stores and surplus dealers. Maps of repeaters, store and swap meet locations. Listing of Packet repeaters, phone BBS and node lists. 64 pages 8 1/2" X 5 1/2"

## NORTH AMERICAN SHORTWAVE FREQUENCY GUIDE

Accurate and complete listing of all English and Spanish broadcasts on the 0 - 30 MHz shortwave bands. Listing are presented in frequency order. Over 200 pages, 8 1/2" X 11"

## LOST USER MANUALS



Lost the manual for your HT or Mobile rig? Did you purchase a used radio and it did not come with a manual? Do you have the manual but still can work the radio quickly?

"LOST USERS MANUALS" contains operating instructions for all the popular amateur radios and scanners. ICOM, Yaesu, Kenwood, Alinco, Standard, Uniden and other manufacturers radios. Each radio is given 2 to 5 pages of drawing, charts and programming instructions. Over 140 Pages, 8 1/2 X 11" format.

*artsci*

P.O. Box 1428  
Burbank, CA 91507  
(818) 843-4080  
FAX: (818) 846-2298

# — ORDER FORM —

License Study Guide

Shortwave Freq. & Ref. Scanner/Freq. Reference

Amateur Reference

Radio Reference

| TITLE                                                                                                                         | DESCRIPTION                                                                                          | PRICE                                                                              | QTY | EXTENSION |
|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----|-----------|
| Radio/Tech Modifications VOL 6A                                                                                               | Over 200 pages of mods for ICOM, KENWOOD Radios & all models of Scanners                             | 19.95                                                                              |     |           |
| Radio/Tech Modifications VOL 6B                                                                                               | Over 200 pages of mods for ALINCO, YAESU, STANDARD and all models of CB equipment.                   | 19.95                                                                              |     |           |
| Lost Users Manuals                                                                                                            | Operating Instructions for all popular amateur Mobiles & Ht's.                                       | 19.95                                                                              |     |           |
| U.S. Repeater Mapbook                                                                                                         | VHF & UHF Repeater guide for the USA with State Maps showing popular repeaters.                      | 9.95                                                                               |     |           |
| Amateur HamBook #2                                                                                                            | Construction plans, coax, antenna, connector, SWR charts. A must have.                               | 14.95                                                                              |     |           |
| Ham Radio Resource Guide                                                                                                      | For Southern California only. Testing, Club, Repeater, maps & more                                   | 6.00                                                                               |     |           |
| Federal Assignments Volume #3                                                                                                 | Scanner Frequency guide for all Federal Government Agencies. Over 300 pages                          | 24.95                                                                              |     |           |
| Police & Fire Communications Handbook                                                                                         | For Southern & Central California Scanner Listners. Best available freq. List !!                     | 16.95                                                                              |     |           |
| Quick-N-Easy Shortwave Listening                                                                                              | Beginning guide to getting started with shortwave listening. Antennas Accessories, Receivers & more. | 9.95                                                                               |     |           |
| North American Shortwave Directory                                                                                            | Complete Listing of all activity on the HF band 0-30MHz.                                             | 19.95                                                                              |     |           |
| Riding the airwaves with Alpha & Zulu                                                                                         | Novice & No-code license test book using cartoon strips to teach. for ages 8 - 80 !!!                | 14.95                                                                              |     |           |
| MAIL ORDER FORM TO:                                                                                                           |                                                                                                      | SUBTOTAL                                                                           |     |           |
| <b>ARTSCI INC.</b><br><b>P.O. BOX 1428</b><br><b>BURBANK, CA 91507</b><br><b>(818) 843-4080</b><br><b>FAX: (818) 846-2298</b> |                                                                                                      | SALES TAX 8.25% CA                                                                 |     |           |
|                                                                                                                               |                                                                                                      | <div>Shipping charge outside the U.S. is \$10.00 or more</div> <div>SHIPPING</div> |     | \$ 4.00   |
|                                                                                                                               |                                                                                                      | ORDER TOTAL                                                                        |     |           |

SHIP TO:

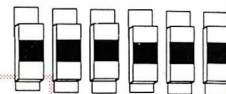
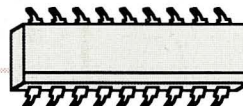
|                                                                                                       |    |          |
|-------------------------------------------------------------------------------------------------------|----|----------|
| NAME                                                                                                  |    |          |
| ADDRESS                                                                                               |    |          |
| CITY                                                                                                  | ST | ZIP      |
| PHONE (     )                                                                                         |    |          |
| <b>BILLING INFORMATION</b> Give us your phone number in case we have a problem processing your order. |    |          |
| <input type="checkbox"/> CHECK ENCLOSED                                                               |    |          |
| <input type="checkbox"/> VISA / MasterCharge / DISCOVER / AMERICAN EXPRESS                            |    |          |
| CARD #                                                                                                |    | EXP DATE |

*artsci*





# Modifications for:



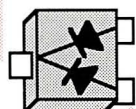
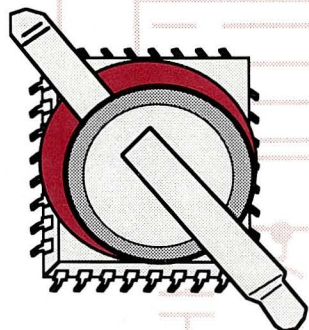
## Kenwood

## ICOM

## Scanners

|           |    |           |    |          |    |           |    |                           |
|-----------|----|-----------|----|----------|----|-----------|----|---------------------------|
| TH-21A    | ∞• | TM-731    | ∞• | IC-02AT  | ∞  | IC-745    | ∞  | <b>Uniden<br/>Bearcat</b> |
| TH-25A    | ∞• | TM-732    | ∞• | IC-2A/AT | •  | IC-751    | ∞  |                           |
| TH-26A    | ∞• | TM-741    | ∞  | IC-2iA   | ∞  | IC-761    | ∞  |                           |
| TH-27A    | ∞• | TM-742    | ∞  | IC-2GAT  | ∞• | IC-765    | ∞  |                           |
| TH-28A    | ∞• | TM-941    | ∞  | IC-2SA   | ∞• | IC-781    | ∞  | BC-200                    |
| TH-31A/BT | •  | TM-942    | ∞  | IC-2SAT  | ∞• | IC-900    | ∞• | BC-205                    |
| TH-41A/BT | •  | TM-2530   | ∞• | IC-3SAT  | ∞• | IC-901A   | ∞  | BC-700                    |
| TH-45A    | ∞• | TM-2550   | ∞• | IC-2SRA  | ∞• | IC-970    | ∞  | BC-760                    |
| TH-48A    | ∞• | TM-2570   | ∞• | IC-04AT  | ∞  | IC-1200   | ∞  | BC-855                    |
| TH-55A    | •  | TR-751    | ∞• | IC-4GAT  | ∞• | IC-2400   | ∞• | BC-890                    |
| TH-75A    | ∞  | TR-2500   | ∞  | IC-4SAT  | ∞• | IC-2410   | ∞• | BC-950                    |
| TH-77A    | ∞  | TR-2600   | ∞  | IC-4SRA  | ∞• | IC-2500E  | ∞• | BC-2500                   |
| TH-78A    | ∞• | TS-50     | ∞  | IC-12AT  | ∞  | IC-3200   | ∞• | MR-8100                   |
| TH-215    | ∞• | TS-140S   | ∞  | IC-12GAT | •  | IC-3210   | ∞• | <b>Regency</b>            |
| TH-315    | ∞• | TS-430S   | ∞  | IC-24    | ∞• | IC-3220   | ∞• |                           |
| TM-221    | ∞• | TS-440S   | ∞  | IC-25    | ∞• | IC-3230   | ∞• |                           |
| TM-231A   | ∞• | TS-450S   | ∞  | IC-27A/H | •  | IC-H16    | ∞  |                           |
| TM-241A   | ∞• | TS-680    | ∞  | IC-28A/H | ∞  | IC-M600   | ∞  | R-4030                    |
| TM-321    | •  | TS-690S   | ∞  | IC-32AT  | ∞  | IC-M800   | ∞  | R-1600                    |
| TM-331    | ∞• | TS-711    | ∞  | IC-38    | •  | IC-P2AT   | ∞• | <b>Radio<br/>Shack</b>    |
| TM-421    | ∞• | TS-790A   | ∞  | IC-48    | ∞  | IC-P4AT   | ∞• |                           |
| TM-431A   | ∞• | TS-850S   | ∞  | IC-228   | ∞• | IC-R71    | ∞  |                           |
| TM-441A   | ∞• | TS-930S   | ∞  | IC-229   | ∞  | IC-R7000  | ∞  |                           |
| TM-621    | ∞• | TS-940    | ∞  | IC-290   | ∞  | IC-RP1220 | ∞  | PRO-2004                  |
| TM-631    | ∞• | TS-950SD  | ∞  | IC-448   | ∞• | IC-RP1520 | ∞  | PRO-2005                  |
| TM-701A   | ∞• | TS-2400   | ∞  | IC-449   | ∞• | IC-RP4020 | ∞  | PRO-2006                  |
| TM-721    | ∞• | TW-4100   | ∞  | IC-575   | ∞  | IC-RP4520 | ∞  | PRO-2022                  |
|           |    | TM SERIES |    | IC-720   | ∞  | IC-DELTA1 | ∞  | PRO-2026                  |
|           |    |           |    | IC-725   | ∞  | IC-U2AT   | ∞• | PRO-33                    |
|           |    |           |    | IC-726   | ∞  | IC-U4AT   | ∞• | PRO-34                    |
|           |    |           |    | IC-729   | ∞  | IC-U16    | ∞  | PRO-37                    |
|           |    |           |    | IC-730   | ∞  | IC-W2A    | ∞• | PEO-39                    |
|           |    |           |    | IC-735   | ∞  | IC-W21A   | ∞• | PRO-43                    |
|           |    |           |    | IC-737   | ∞  | IC-W21AT  | ∞• | PRO-46                    |
|           |    |           |    | IC-740   | ∞  | IC-X2A    | ∞• |                           |

∞ Frequency Expansion  
• Alignment controls



## Volume 5A

*artsci*  
artsci inc  
P.O. Box 1428  
Burbank, CA 91507

ISBN 0-917963-10-5

